SPECIAL REPORT! HOW FORD'S FALCON WAS STYLED

Motor Trend

SEPTEMBER 1959 35c

"THE AUTOMOTIVE TESTING MAGAZINE"

DETROIT

DETROIT'S plans for YOU in 1960!

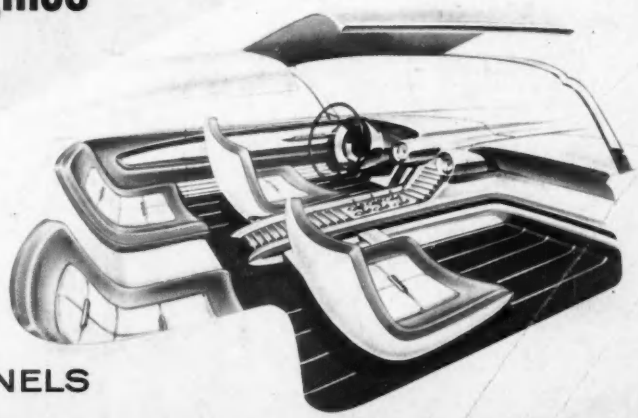
Better performance, Better mileage

Aluminum and aircooled engines

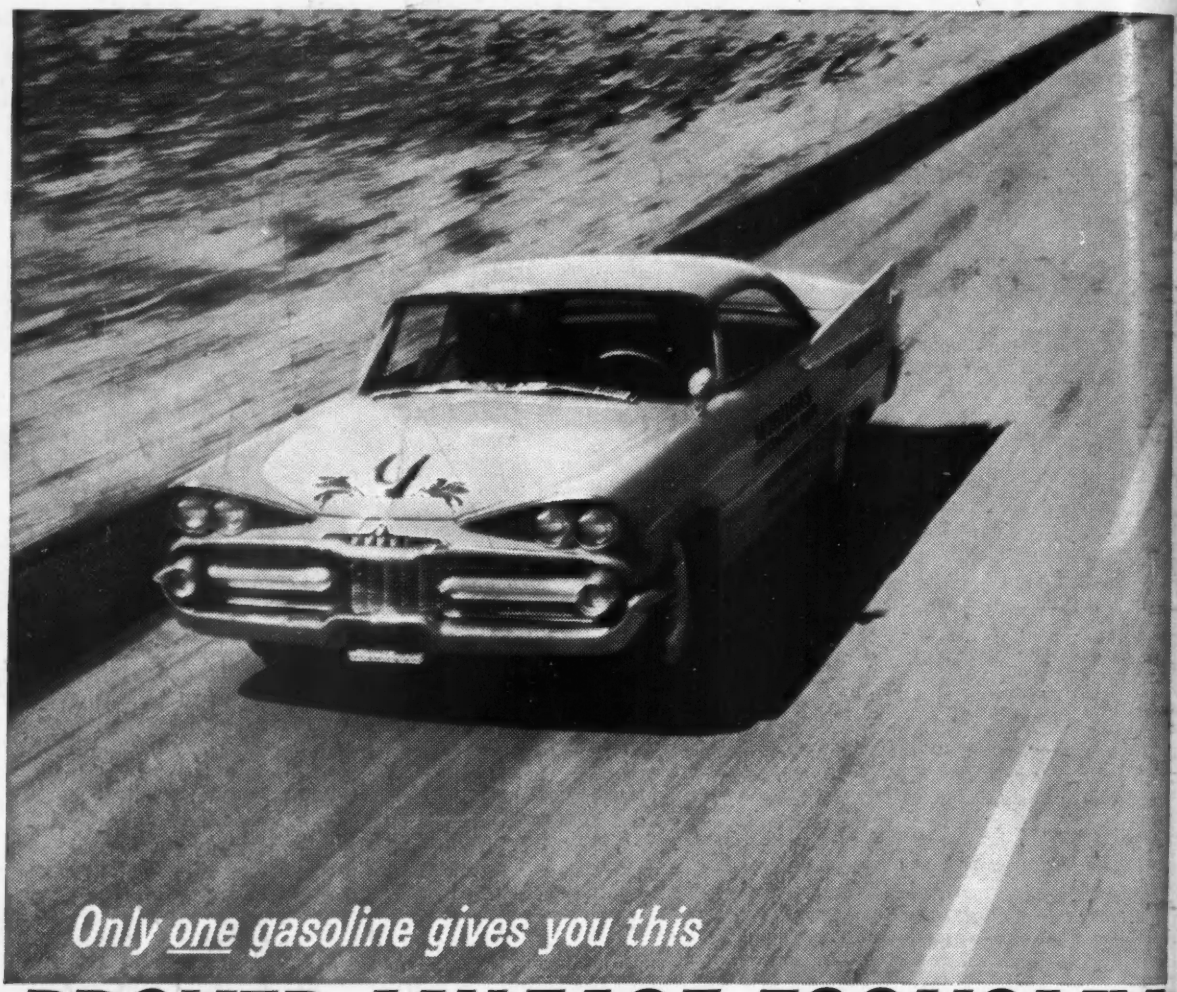
Choice of big or small cars

More unit bodies

Page 20



ALSO
NEW INTERIORS
AND INSTRUMENT PANELS



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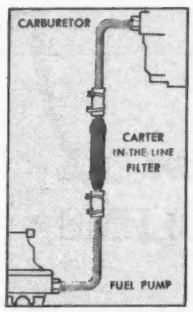
$3.95 GAS FILTER CURES YOUR CAR'S "HEART FAILURE"!

Prevents Flooding and Stalling By Keeping Your Gas Supply Clean

Until recently there was no really effective way to protect your car's "heart", the carburetor, from tiny specks of gas-tank dirt that cause flooding, stalling, and poor performance. Then Carter Engineers got busy on the problem.

Result—the new Carter In-The-Line Filter—with an exclusive ceramic unit and Magnatrap® that stop dirt and metal particles .0012 inches and smaller! You can install it in minutes just by removing 4¾" of the fuel line and fitting it in place. Neoprene hose and clamps supplied.

Give your carburetor a break—prevent flooding, stalling, and carburetor 'erosion'. *Install a Carter In-The-Line Filter today . . . available at service stations and garages everywhere.*



Install between fuel pump and carburetor. Three sizes fit all cars.

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THIS NEW *Dual Action* OIL SOLVES BOTH PROBLEMS

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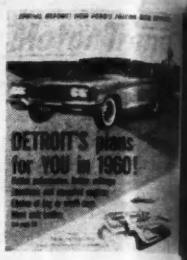
Stop-go city driving produces "cold engine" sludge that breeds quick, costly wear. Long trip highway driving means "hot engine" piston and valve varnish—an annoying power-robber. Get rid of both. Change to new Kendall Dual Action Motor Oil. It's refined with pride from the cream of Pennsylvania Crude Oil.

Ask your Favorite Dealer for it Now

KENDALL REFINING COMPANY
BRADFORD, PENNA.

COVER: The Lavion was only one of 20 designs proposed for the Ford Falcon that reached full-size clay model stage before the final choice was made. Ford's Chief Stylist, George Walker, beams proudly alongside the mock-up. Complete story can be found on page 38. The drawing at lower right is of a conjectural interior; specific information about Detroit's styling plans for '60 is found on page 20.



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Motor Trend

"THE AUTOMOTIVE TESTING MAGAZINE"

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NEXT MONTH

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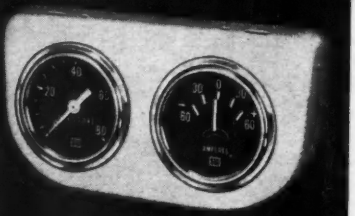
"They're Still Wheeling and Dealing—Despite 'Posted Prices'."

Practical Ways to Customize Your Top

Special Analysis of the New Wide Choice in Sizes and Body Styles in U.S. and Imported Cars

STEWART-WARNER DELUXE TWIN GAUGE PANEL



A "MUST" FOR ENGINE SAFETY

. . . ON CARS WITH JUST PANEL WARNING LIGHTS!

If your car is equipped with just battery and oil warning lights, you need an ammeter and oil pressure gauge for complete operating safety. For finest gauge performance and dependability, install the new Stewart-Warner Deluxe Panel and Gauges!

Stewart-Warner Ammeter—tells actual rate of current flow, helps prevent burning out a generator . . . overcharging or discharging of battery.

Stewart-Warner Oil Pressure Gauge—tells *exact* oil pressure in pounds, at any engine speed.

Stewart-Warner Deluxe Panel—Luxurious off-white "Colonial" grain color harmonizes with any interior. Bracket, light wire and socket included. Accommodates two Stewart-Warner Gauges of your choice in economy, heavy-duty mechanical or electric types.

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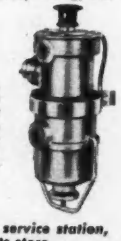
Maximum delivery. Quick starts. Prevents vapor lock. Adjustable pressure feature. No starving or "flatten out." Eliminates stalling due to fuel surge. Recommended for today's high-compression motors. 6-volt and 12-volt models.



Ask for them at your car dealer, service station, garage or automotive parts store.

Symbol of SW Excellence

INSTRUMENT DIVISION
STEWART-WARNER CORPORATION

Dept. AL-99, 1840 Diversey Pkwy., Chicago 14, Ill.

"Man... It's the most!"

"I've tried a lot of stuff over in my quarter midget," says champion driver, John Kuramoto, "and for my money, Wynn's Friction Proofing is the greatest. My dad and I are really proud of my car, and you can bet I wouldn't use anything in it but the very best."

Twelve-year old Johnnie is the present AA Open Fuel Class National Champion... an honor he won last December in Phoenix, Arizona. Although his father operates a garage-service station in Los Angeles, young John does most of the work on his car himself. "I do all of the lube and grease work," he says, "and I use Wynn's Friction Proofing products right down the line—in my oil, grease and gas... and man, when I need that extra performance Wynn's is the most."

Formulated in Europe by Wynn's Friction Proofing plant in Belgium for European cars, Wynn's Friction Proofing for Sports and Import Cars is now available at service stations throughout the United States and Canada.

THE Best IS BY FAR THE Best Investment

Letters FROM OUR READERS

DETROIT—SINNER OR SAINT?

Dear Editor:

I am quite sincere in my belief that the poor steering qualities of our cars are responsible for many deaths on our highways.

It is criminal, in my opinion, to allow a high-speed car to be put on the market without the quick, positive steering found on most European cars. In certain hands, Detroit cars are deadly, as the traffic tolls show.

Our cars are evidently still being made for the time when the roads were practically empty, and the speed was low. The slow type of steering was okay for times gone by, but not today.

If Detroit wants me to buy their products, they will have to give me what I want—not what my women have been talked into wanting. I would, of course, prefer to buy American. However, buying a piece of poorly engineered junk is not my idea of patriotism.

A. Zanelli Tampa, Fla.

Dear Sirs:

At a time when Detroit engineers are receiving a great deal of criticism, I would

like to praise the men at GM and Chrysler. These men are on the right track, doing a wonderful job in advancing the automobile industry.

Detroit automobiles are the most beautifully styled in the world, bar none. They are not too big, as most normal people do not like to ride in little, beetle-like underpowered foreign cars. American cars get better gas mileage than ever before. A comparison of the '59 cars with the '49s will confirm this.

Here are a few of the automotive "greats" pioneered by Detroit:

Ohv V8 engine—they offer the maximum in performance, dependability and good gas mileage. These engines loaf along and offer the ultimate in safety, because reserve power is there when it is needed.

Fuel injection—Chevrolet's Ramjet fuel injection is a marvel of smooth performance, astonishing acceleration, very good gas mileage and dependability.

Torsion-Aire ride—the finest suspension in the world. Pioneered by Chrysler, it is a wonderful experience to drive one of their cars with this suspension, as it is unequaled.

Chevrolet's four-speed gearbox—one of the finest transmissions made. It is extremely rugged and has given faithful performance in my Corvette.

Positraction, Sure Grip, etc.—limited-slip differentials are very good for snow, ice, mud, as well as racing. They are worth the extra cost.

I know a lot of fellows who feel the same way about American cars. Keep up the good work, Detroit!

Bob De Mares Burbank, Calif.

The items reader De Mares refers to were not necessarily pioneered by Detroit, but they certainly are achievements of which their engineers can be proud.—Ed.

Dear Sir:

I am thoroughly convinced that the American car is the best buy in America today. The added dollars are few in comparison to what is offered. They are longer and wider, which offers more interior room and eliminates the sardine can feeling. They are heavier, which affords better control and roadability as well as desirable ride qualities.

For your dollars, you get more room, more comfort and better ride—to say nothing of

better visibility, luxurious interiors and better styling. So add 'em up—you'll see the American car is still a good buy.

Douglas A. Warnecke San Fernando, Calif.

THANK YOU NOTE

Dear Sir:

This is a note to say thank you. I have followed your Product Use Tests with great pleasure, because I feel this is the answer I have wanted. I have tried the products, have found them satisfactory and feel that I am indebted to you for saving me a lot of money.

Each month I anxiously wait for MOTOR TREND'S Product Use Test section.

R. Jackson Canoga Park, Calif.

CARBURETOR—NOT INJECTOR

Sir:

I liked your article on fuel injection in the July MOTOR TREND, but you left something out.

Maybe you don't know about the Fish carburetors, made at Daytona Beach, Fla. I use them on a Chrysler-powered two-ton truck. The performance at high and low speeds is exceptional for a modified engine.

M. J. McCamis Portsmouth, N.H.

The Fish carburetor uses "injectors" in the butterfly, with the fuel being pulled in by manifold vacuum only. This makes it a carburetor, not an injector.—Ed.

PRIVATE INVESTIGATOR

Sirs:

I think you might be interested in a car I encountered on the road today. I'm sure it is a test vehicle for the new rear-engine GM running gear, chassis and components.

The car was a 1958 Vauxhall. I had spotted it pulling out of the River Road Chevrolet plant outside of Buffalo. I gave chase and noticed these things to set it apart from a stock Vauxhall: First, it had louvers in two rows cut into the trunk lid (the sound, not unlike that of a Porsche engine, emitted from the trunk); the wheels were spaced wider apart, necessitating cutting the rear

wheel opening larger to accommodate the rear tires; there was a filler cap on each front fender and the one on the left front fender had a door like the gas filler doors we see today; I noticed when I pulled alongside that the stock dash panel had been replaced with a flat sheet metal one containing many test instruments.

The car produced a pretty good turn of speed and showed evidence of an automatic shift, including a passing gear. At no time during the few miles that I tailed the car did the driver appear to shift, even from stop lights. And when he accelerated hard, the car appeared to downshift as a passing gear would.

Martin H. LeVan — Buffalo, N.Y.

A HAPPY SOLUTION

Dear Sir:

Among the letters printed in MOTOR TREND, I have noticed several from readers expressing disgust and dissatisfaction with the quality and workmanship of American automobiles. Many of them say that they have bought their last American car and that their next car will be an import, as they feel that is the only way they can escape from the extremely poor quality control of American cars of recent years.

I can sympathize with these readers, as I have been in the same predicament, but happily, I have found a solution without turning to imports and their many disadvantages. That solution, and one that is proving very satisfactory, is the Rambler.

R. W. Martin — No. Miami, Fla.

NEAT, COMPACT PACKAGE

Dear Sir:

This business about the compact car has me amused. People scream and shout about the size of our cars. They talk about the increase in size, which is actually diminishing. The horizontal lines have been the main thing to increase size. I was in Europe for three years and sure was glad to get back to our living rooms on wheels.

It seems to me that the coming car will be more on the line of the Lark. A car that will look good in front of a suburban cottage or the local country club; a neat, well-designed means of transportation, a car designed with its paint color in mind and not painted afterwards. A car designed as a package in itself as other products are.

Bud Hall — Weslaco, Tex.

TAKE ANOTHER LOOK

Gentlemen:

Please take another look at the Hudson alongside the safety car, "Sir Vival," July issue, page 12. I'm sure you will agree with me that it is a 1952 or '53 model—not the '46 you mentioned.

Joseph Amadio — Jeannette, Pa.

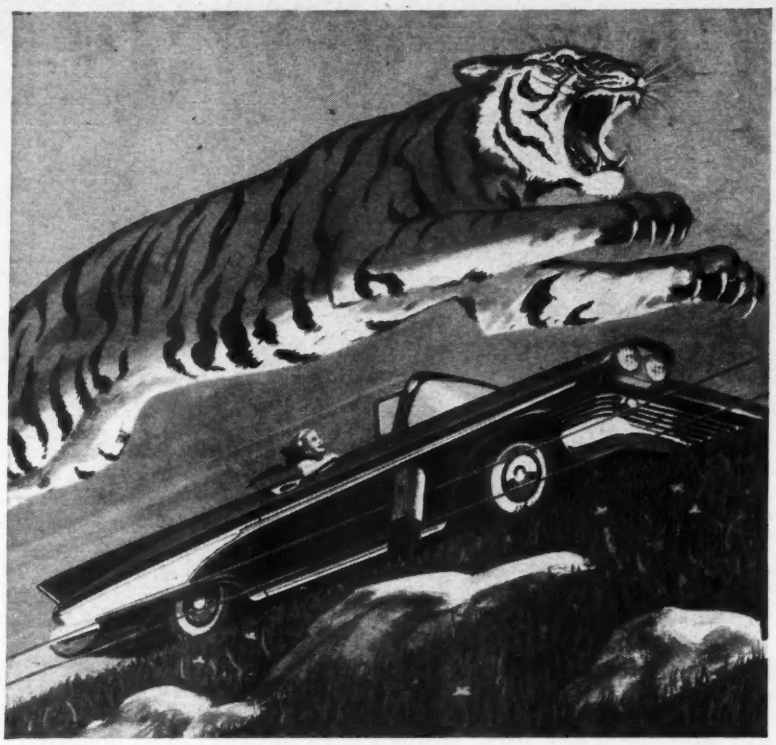
Though the Hudson pictured alongside for size comparison was a '51, the Sir Vival was based on a '46 model.—Ed.

WILL IT BE A HIT?

Gentlemen:

If Oldsmobile would take the body style of their F-88 III and develop a production sportscar like the Corvette, I think it would make a big hit—especially if it were reasonably priced.

Richard Smith — Birmingham, Ala.



New "Go" • New Economy • Smoother Tone with a *Dyna-Glas* muffler

Give your engine a new "throat"—then listen to its deep breathing purr of power. Here's power you can unleash at a mere touch of the throttle—real "go" power that flattens out the hills and gobbles up the straightaways with a rush.

And that deep mellow tone brings you new gas economy. The big straight-through Dyna-Glas inner tube lets your engine breathe faster, run more efficiently. So along with increased horsepower you get real gas economy as well!

There's a rugged, long-lasting Dyna-Glas specially designed for *your* car. And for an extra zing in driving thrills, get Dyna-Glas duals for your V8. Boosts horsepower up to 16.4%, gas mileage up to 15%. Precision made to fit—parts kit with clear instructions makes installation easy.

For a superlative straight-through muffler, ask to see the exciting premium-quality Super-G muffler.

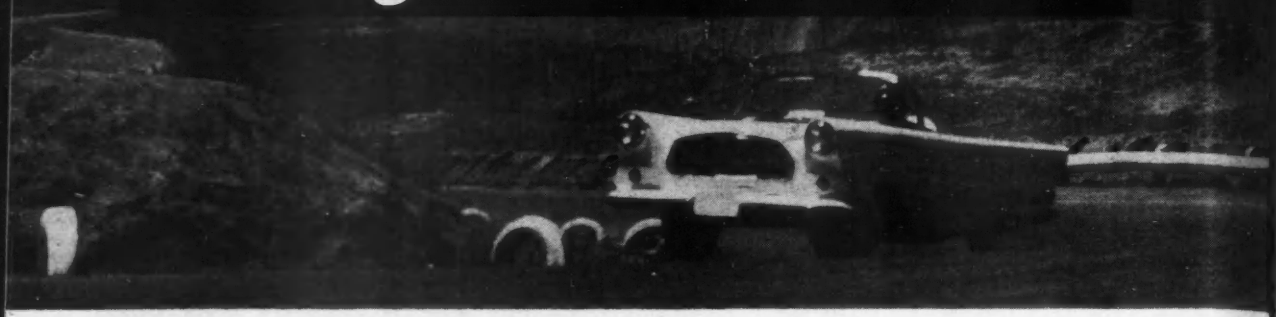
1. Heavier double-wrapped outer shell for longer life
2. Fiberglas packing allows only deep mellow tones through
3. Straight-through 2-in. tube for more power
4. 16 gauge spun-locked blowout-proof outer heads
5. Precision-sized nipples for easy installation
6. Rich gold color

AT YOUR FAVORITE DEALER OR AUTOMOTIVE STORE

Dyna-Glas

GOERLICH'S, INC.
Dept. 16J, Toledo 1, Ohio

Driving Around | WITH THE EDITOR



THE CAR YOU SEE in action here is known as the Shamrock, but we think it looks enough like a Thunderbird to call it the Irish T-Bird. It's a prototype four-seater sportscar designed by Bill Curtis, built in Ireland and intended for full-scale production around the first of '60. The shot was taken at Riverside Raceway, where we had intended to run a full-scale test on the car. We encountered some problems with the engine though (through no fault of the builders), and will have to wait until they are solved before we bring you our test report. In the meantime, you can read our introductory story on page 48.

* * *

EVERY SUMMER—and in some sections of the country that's from May to December—there's good reason to want air conditioning in your car. Many offices are now air conditioned, and so the time from home to office and back again can be made miserable by comparison. Even if you're not lucky enough to have air conditioning in one of the other spots, if you spend lots of time in your car that time can be made more enjoyable with an air conditioner.

Though we're alway happy to test a car that's fitted with an air conditioner (for the comfort value alone), we've had the erroneous opinion that it's fine, *if* the car is a big, powerful one. So, it was with a certain amount of reticence that we accepted the offer of Frank Gress, service representative for the Goliath Sales Corp. (West Coast distributors), to test a Goliath 1100-B sedan with an Artic-Kar conditioner installed and ready to go.

At the end of a week's use of the car, during heat that ranged in the high 80s, we were just as reticent about giving the car back. We could have kept it lots longer and continued to enjoy it—but Frank wanted it and I can't blame him. This unit not only cooled the car off to any comfortable temperature you would like, but also filtered out the irritating ingredients in the smoggy air. You could step out of the clean air in the car and within minutes your eyes would water from the smog.

The complete installation is one of the neatest we've seen to date: The compressor is located to one side out of the way; the coils of the condenser are wrapped around the front of the radiator and on two sides in front of the air intakes; and, the unit itself is up out of the way under the passenger's side of the dash. You can't reach the controls too well from the driver's side while driving (or at least shouldn't), but you don't have to fiddle with them much anyway.

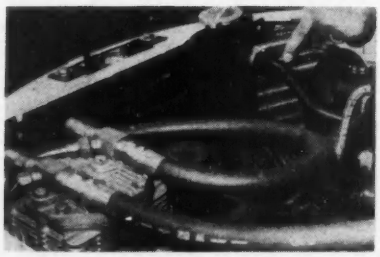
The amount of average temperature drop within the Goliath was startling: within three minutes it dropped from 95°F to 91; six minutes, to 86; nine minutes, to 83; 18 minutes, to 70. At the outlet itself, the temperature would tumble 38° in six minutes, getting as low as 40°F. These temperature drops were accomplished with maximum cold and high blower settings; they could be maintained with a lesser cold setting and less air velocity.

Surprisingly, the difference in performance is not startling with the conditioner on or off. The fact that it does rob some horsepower from the 46-hp four-cylinder engine results in adding a few seconds to the normal 0 to 60 mph time of 26 seconds. The mid-range performance also suffers a bit under full load; in accelerating under full load in third gear there is a slight tailing off of power as you approach 50 and it takes you about two seconds longer (14 instead of 12) to get to that speed.

The mileage loss is hardly noticeable—and with upwards of 30 miles to the gallon—who could complain anyway?

A couple of complaints I *do* have: 1. The blower on the high setting is noisy enough to drown out the sound of the engine. (Of course, put another way, you could say that the engine is so *quiet* it can't be heard above the sound of the blower.) 2. The sun's rays beat through the glass and you feel the heat on your body. This could be curtailed by tinting the glass all around.

So, complain. I wish I were in that Goliath right now. The air conditioner is worth every bit of the $325 it costs (installed)—and it still takes the price of the Goliath to only $2320 p.o.e.



Compressor for the air conditioner in the Goliath can be seen in left photo. Condenser is wrapped around in front of the radiator and on the sides (indicated by finger).

THIS YEAR'S ANNUAL "BIG GO," the National Hot Rod Association's fifth national championship drag races, is slated for Detroit, Mich., from Sept. 3-7 inclusive. It will be held on a new 4500-ft. strip—the Detroit Dragway—that's just 20 minutes from downtown Detroit and 30 minutes from Toledo, Ohio.

If you've got a dragster, sportscar or stocker that "goes," and you'd like to pick up a few trophies, then this is the place *to go*. An unusual event will be night drags for production stock cars. And if you

want more information or an entry form, write to: NHRA Nationals, 1171 N. Vermont Ave., Los Angeles 29.

* * *

ON MY RECENT TRIP TO FRANCE to drive the Renault Caravelle (Aug. '59 MT) I thanked the stars that we still don't have the traffic situations in this country that they have over there. Traffic in Paris, then out on Friday nights and in on Sunday nights, is abominable. But when the French can move, they do—with verve.

The right of way, in most cases, belongs to the driver on the right. Some of them use it to an almost ridiculous degree, coming out of small side streets and then cutting in front of a car on the main highway that may be driving 60 mph.

There was a cartoon recently in France that illustrated this point perfectly. It showed a Frenchman in a tree, a steering wheel in his hands, his face cut and bleeding, with the caption, "But I had the right of way!"

STOP SIGNALS (lights or signs) are few and far between once you leave Paris. On the trip in the Renault to Brittany I remember only two stop lights and two boulevard stops. This was a distance of 280 miles. With no speed limit on the open highway you barrel along at whatever speed you can, watching for all types of slower traffic and vehicles like bicycles, horse-drawn carts and pedestrians. Most towns have speed limits varying from about 35 mph down to 20. They are not observed too closely but if you come squealing around a corner (faster than the speed limit) and a gendarme happens to be there, he will probably stop you.

One other thing to watch for, and that's not to cross over a solid yellow line.

Air conditioner is mounted up under dash on passenger's side, leaves fair footroom.

To do so invites a ticket, regardless of whether you can see around a corner, down or up the hill. I know. I did it and got a lecture from two gendarmes who "happened" to be waiting for just such violators. How I "talked" my way out of that I'll never know. I guess mainly because they were fascinated with the Caravelle and finally understood that I was a member of the press on a test tour.

Karl Kaver

Build Your Own IGNITION ANALYZER for just $59.95

HEATHKIT New Model IA-1A

- **A Fraction of the Price of Comparable Instruments**
- **New, Improved Design Shows Primary or Secondary Patterns**
- **Provides In-Action Check of All Ignition Parts**
- **Finds Systems Weaknesses Without Removing Individual Components**

The Heathkit IA-1A offers the hobbyist, small garage owner, or service station operator an ignition analyzer with the features of scopes costing several times more.

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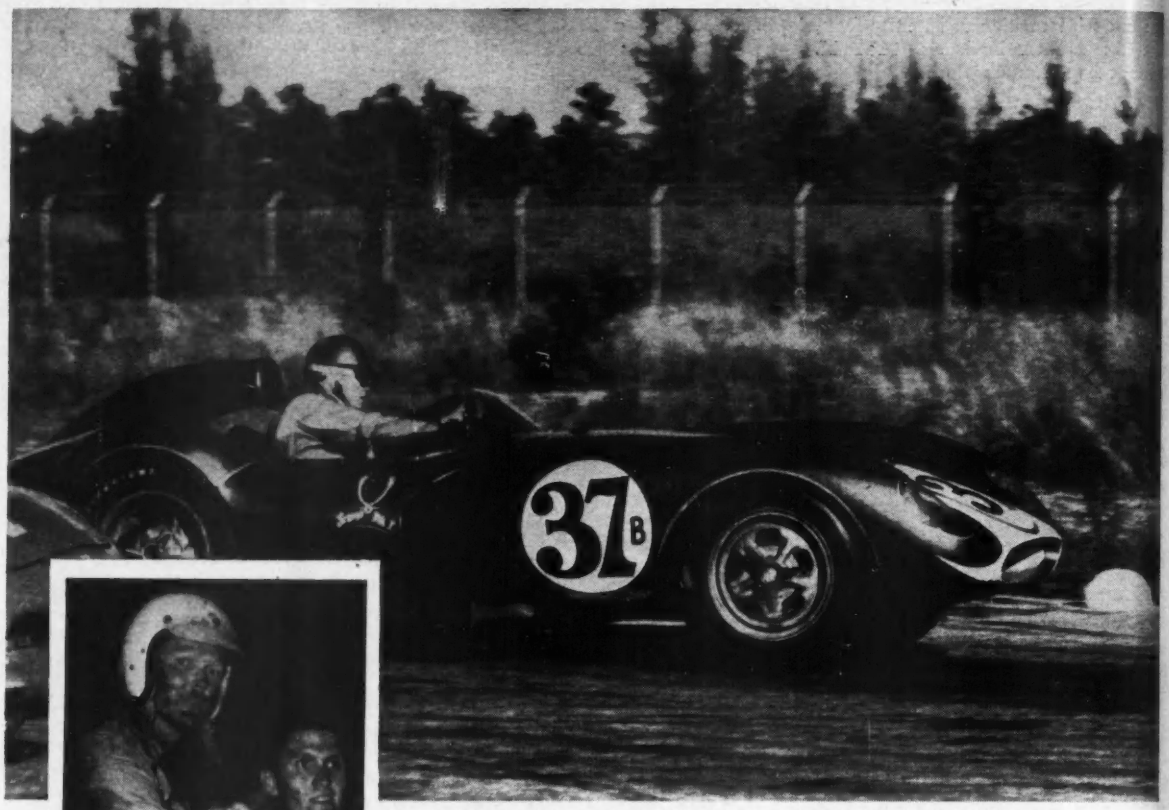

'58 NASSAU WINNERS, CHUCK DAIGH (LEFT) AND LANCE REVENTLOW SAY: "Firestones helped us win the Nassau Trophy. Although Nassau's coral rock surface is twice as hard on tires as any other track, our Firestones showed very little wear, gave us great stability in the turns, and were safe all the way."

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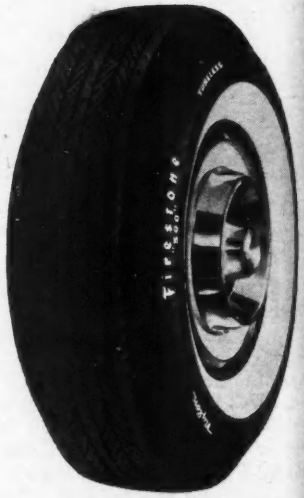

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Detroit NEWS AND VIEWS

by Bill Callahan
Detroit Editor

YOUR COMPLAINTS DO HELP

Customer complaints of poor workmanship, and generally low quality in American automobiles over the past few years are bearing fruit. This probably accounts for the fact that there will be no major mechanical changes in the 1960 crop of cars, as far as the standard lines are concerned, but there is no question that they will be different....All companies now have established pre-production assembly lines where supplier parts are put to a real test to make sure they are in complete agreement with specifications before they are passed or are accepted for actual production....In some cases this has resulted in adopting new materials and setting up new designs. This is particularly true in wiring harnesses which frequently gave trouble due to faulty assembly. By adopting wiring that cannot be cut if a careless assembly line operator wraps it around a sharp metal edge, these problems are pretty much ended. Where possible, too, wiring circuits are printed on insulating boards so when the board is put in place the printed circuits are positive and do not suffer from loose connections or crossed-up wiring. The whole plan is aimed at taking all possible chance out of assembly....

EXHAUST SYSTEM CHANGES

Exhaust systems during the past few years have been giving considerable trouble with muffler units and tailpipes requiring frequent replacement. These units for 1960 are being simplified. In some cars two or more muffler units were used in each exhaust line where for 1960 there will be one. Most mufflers, too, are being treated to reduce corrosion to a minimum....Use of new sound-deadening materials to damp out engine and road noises has been greatly extended. Butyl rubber, which absorbs vibrations without setting up vibrations of its own, is being used extensively where rubber formerly was used....Thompson Ramo Wooldridge and Chrysler are pooling their research to come up with "...a simpler, more durable and compact [smog exhaust device] that can be produced at a reasonable cost." When completed, this afterburner-type unit will replace present mufflers....

THE BATTLE FOR FIRST

The perennial battle between Chevrolet and Ford for first place in sales for 1959 is rapidly heading to a climax. Chevrolet claims their mark is 44,000 units ahead of Ford in the first eight months of the calendar year 1959, while Ford's claim is 10,000 units ahead in the model year, starting last October. In any case, both companies are running far ahead of their 1958 levels. In a surprising 3rd position is Pontiac, with a slight edge over Olds. Plymouth is 5th, Rambler 6th, Buick 7th, Cadillac 8th, Merc 9th and Stude 10th (mostly due to the Lark). Chevy, Ford, Pontiac, Olds, Rambler, Cad, Merc and Stude are all over last year's sales at this time. Biggest drop in sales is seen by Plymouth and Buick (3rd and 5th, respectively, last year).... Earlier forecasts of a 6.5-million-car year now seem more realistic.

S T R I C T L Y R U M O R

Ford Motor Co. will soon replace the cast-iron engine in its Falcon line with a much lighter-weight aluminum engine. Unlikely. Ford has had wide experience in the development of aluminum engines for aircraft and army transports, but our information is that Ford considers the advantage of weight-saving in automobiles to be offset by the current disadvantages of aluminum used for engine blocks....Chrysler and Ford may try to match the Corvair's flat floors made possible by its rear-engine design by countering with a new front-drive arrangement. Very possible. Serious research has been conducted along these lines and considerable progress has been made toward eliminating the objectionable features. ...Electronic ignition will appear on several 1961 cars as standard equipment. False. Especially if the rumor means a system that will eliminate spark plug wires, distributor, etc....Some companies are dropping their transistor/portable radios for '60. True. Not enough customers....Centralized, one-shot lube systems will be discontinued in '60. True. Lack of buyers....1961 is the year of the "big change" for General Motors. Probably true. Though it seems strange to be talking about '61 when the '60 models are about here, 1961 does seem to be the year when GM will reinstate 3 different body sizes and will come up with the much-publicized trans-axles....

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New transmission promises use of lesser-powered, smaller engines and better mileage

DATELINE, ROCHESTER, N.Y.–Curtiss-Wright Corp. has ordered a crash development program for a revolutionary automatic transmission developed here by Charles E. Kraus, a design engineer. Kraus said Curtiss-Wright has obtained an exclusive worldwide license to build and sell the traction-drive device. . . . He is going to the C-W plant at Woodstock, N.J., where he will head development of the device. He said his first job would be to direct a task force of engineers to turn out an automatic drive for autos. . . .

After we went to press with our announcement of this new transmission in the August issue of MT, the above news report was flashed over the wire. For a first-hand report we went to Bill Hackman, a staff writer for the *Democrat and Chronicle* in Rochester. Bill had a chance to discuss this automatic transmission with the inventor and later took a drive in it. Here are his comments:

"The father of this transmission—it's called a traction drive—is Charles E. Kraus, a design engineer. He has been working on the transmission as a hobby for 20 years, working on it intensely in the past five years.

"Salient points of this transmission, according to Kraus, are:

1—It transmits power smoothly from zero to peak.

2—It shows little sign of wear after the equivalent of 200,000 miles of use in the laboratory.

3—Its cost should be about the same, maybe less, as compared with present automatics.

4—Tolerances are less critical, so it is easier to build.

5—While used currently with a 51-hp engine, it can be adapted to any power through further designing. Its capabilities are cubed as its size is doubled; a unit twice as large could handle eight times as much power.

6—New engine designs will be in order, resulting in smaller and vastly more economical engines having unchanged performance.

7—The present Kraus transmission already is outdated. A new design is more efficient, lighter, smaller, simpler, cheaper.

"Traction drive, says Kraus, is an old idea. It was used on pioneer cars and is used now to handle the output of fractional horsepower electric motors.

"A traction drive is simple in operation. We've seen action photos of roulette wheels. We are shown the ball that goes around and around, traveling more slowly with each revolution as it descends into the conically-recessed wheel until it finally plops into the numbered slot.

"Actually, its revolutions per minute hardly change until that final, fatal second, but the ball's speed diminishes rapidly because it is traveling in a circle that shrinks steadily as the ball sinks into the cone.

"You have the idea. So we take two discs shaped like dinner plates and put them bottom to bottom—or back to back. They are separated by small rollers that operate along the underside of the plates' lips. The plates are separated by vertical discs spaced around the rim, and are able to move toward and from each other as the discs move toward the center or toward the edge.

"When power is applied to one plate, the discs twist and tend to approach each other or wander outward. Being free to move in or out, they find the path they like best, all the time making the second plate revolve. When the discs are close to the center, number two plate revolves slowly; when they are out, this plate turns rapidly.

"Several months ago Kraus bought two American Ramblers for comparison runs, and used the facilities of Feol Nash Inc. for converting one of the sedans. Through Feol he obtained a Metropolitan engine of 51 hp and substituted it for the 90-hp plant in the test car. The drivetrain at present consists of a clutch, gearbox for putting the car "in gear," Kraus traction drive and gearbox for reverse only. This setup will vanish with proper designing and the entire operation will be automatic.

"Kraus and I took the N.Y. Thruway on a bright morning as he showed off his traction drive sedan. We eased smoothly into traffic as he put the forward transmission in gear and let the clutch in. My first impression was the absence of slight tugs noticeable in hydraulic transmissions in changing from one band to another; on the other hand, it "dug in" sharply for pickup, unlike the softer, less efficient fluid transmission.

"The Metropolitan engine, which actually is the English-built four-cylinder Austin, seemed to be under no strain as it snaked the heavy sedan through lively traffic.

"Once on the road, Kraus quickly put the car up to 60 and leveled off. Among the many instruments and controls in this test car is a tachometer for showing engine revolutions.

"There was little change in car speed although Kraus held the accelerator pedal steady, upgrade and down. The revolutions per minute were constantly changing, however. Kraus controls engine speed through his transmission rather than through the carburetor, so there is less variance in car speed.

"Mr. and Mrs. Kraus took the two Ramblers on a test run to New York City and back. The test car averaged 30.6 miles per gallon, while the standard sedan got 18 mpg.

"Kraus has his automatic transmission—he now has need for an engine to work with it. Not the Metropolitan, but one designed specifically to take advantage of the peculiar traction drive possibilities."

MOTOR TREND feels safe in predicting that within two years enough development and testing work will have been done to enable Kraus and Curtiss-Wright to put such a traction-drive transmission on the market—for production automobiles. /MT

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Burning Oil?
Leaky Transmission?

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Stops Oil Burning Fast! Stops blow-by, quiets valves and lifters. Reduces friction and wear, reduces exhaust smoke. Increases compression. Insures easier starting. *Contains CGA which plates cam shafts, cams and all parts of the valve train, substantially reducing wear and noise.

Pyroil Rx-3

For Leaky Transmissions— Stops leaks and conditions all types of automatic transmissions. Cleans and lubricates, eliminates sluggish uneven shifting.

TECHNICAL INFORMATION

Pyroil Rx-1 dissolves power robbing gum and varnish deposits. Loosens the binder holding carbon to metal surfaces, carbon is blown out with exhaust gases. Cleans spark plugs. Cleans out fuel lines, carburetor jets.
Pyroil Rx-1 in the lower engine purges out gum and goo. Frees stuck hydraulic valve lifters.

Pyroil Rx-2 Stops oil burning fast. Forms a compression seal, prevents blow-by. Keeps oil thin for easy starting, yet prevents oil from thinning out when hot. Contains Cam Guard Additive, provides a plated film on camshaft cams and all parts of the valve train, reducing excessive wear and noise.
Rx-2 comes in a quart can for easier pouring, replaces a quart of oil at oil changes.

Pyroil Rx-3 Stops leaks caused by the drying and shrinking of transmission seals. Brings new life into hard and glazed seals, keeps them soft and pliable. Contains Pyroil, prevents wear and reduces friction. Eliminates sluggish uneven shifting.

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The car in which we logged 181 city and country miles, around the New York area, was supplied by Peter Miller and Ken Langridge of the Rootes organization's service depot in Long Island, N.Y. When it was returned, our figures read 27.16 mpg average for the tour. Less than half the total mileage logged was country cruising, and in the jam of New York City traffic the car was by necessity operated in the intermediate gears.

We are glad to see the rejuvenation of the Singer auto, even though it appears definite that its competition days are over. The present car is respectable, just sprightly enough to hold its own in any normal traffic with ample reserve power and braking capacities in our simulated emergency tests. It has the overall look of a much more costly machine. Performance-wise, acceleration through the quarter-mile averaged just under 23 secs. and 56-plus mph with two aboard.

For $2349, p.o.e. New York, the Singer Gazelle owner should note considerably more than bargained for. Seats in the convertible—individual bucket-type in front and bench seating in the rear passenger compartment—are covered with a soft, well sewn plastic material that bears a remarkable resemblance to real leather in both appearance and feel. With the top rolled back to the mid-point and windows closed, draft-free open-air motoring can be enjoyed in both front and rear seats.

The engine is rated at 60 bhp, with the same bore and stroke of the old SM-1500 but with only one Solex carburetor and push-rod-operated valves instead of the former high-in-block cam. A column-mounted shift lever operates firmly in the reverse H position with first gear located farthest away and up from the driver; the new owner is cautioned to use extreme care to avoid former shifting habits. All three floor pedals—brake, clutch and accelerator—are suspended, ride is pleasant and smooth with 27-29 lbs. in tires front and rear.

Instruments are placed in the center of an attractive wood-trimmed dash panel and include a layout similar to Jaguar. Speedometer contains a trip meter, water temperature gauge, and gauges for oil and gas. Turn indicator control is within fingertip reach under the left side of the steering wheel.

Optional equipment includes an overdrive for third and top gears, but handling without this extra is safe and comfortable. A station wagon model is also available.

—Steve DaCosta

Wood-trimmed dash panel, simulated leather seat upholstery are added touches of luxury.

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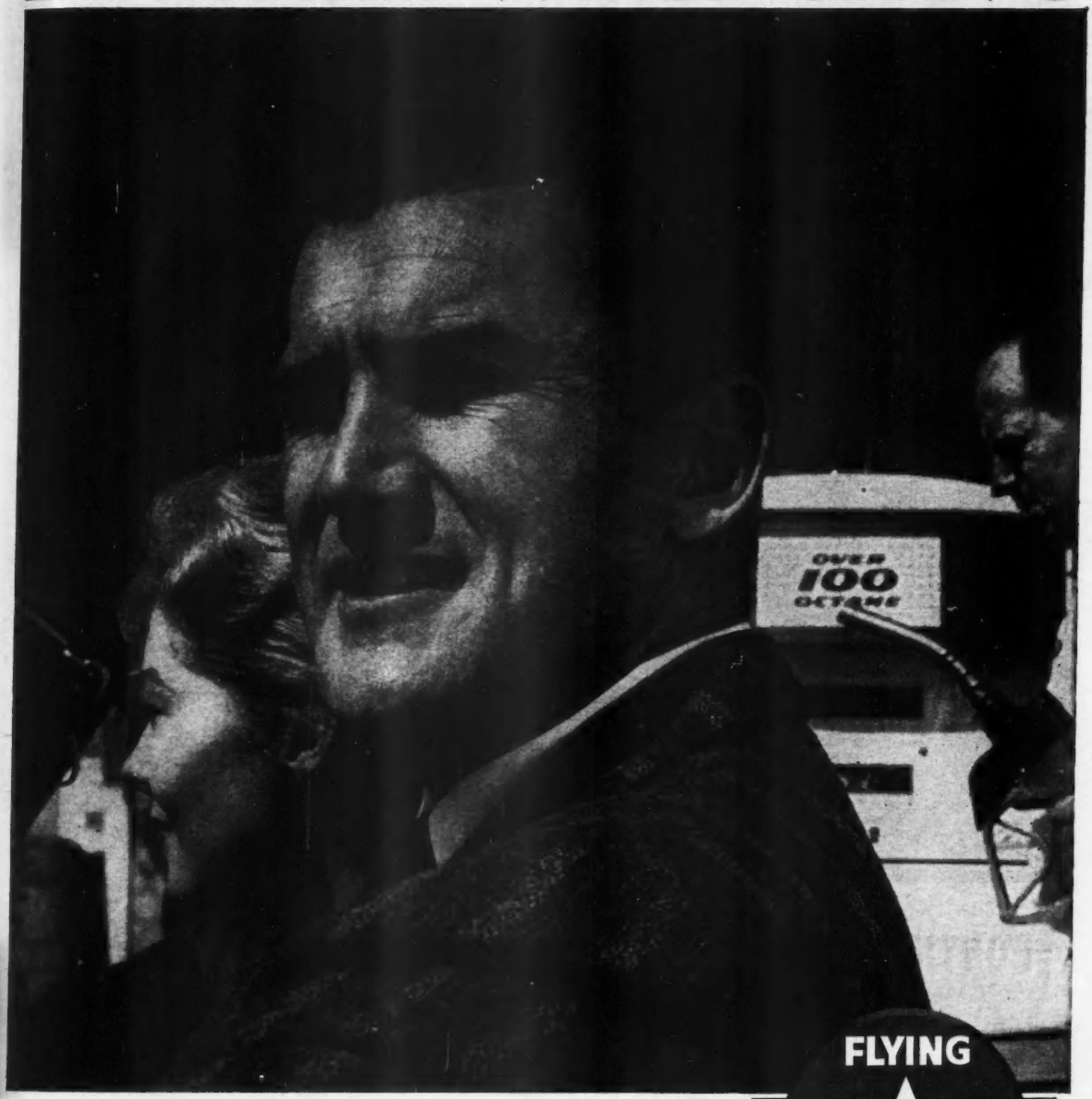

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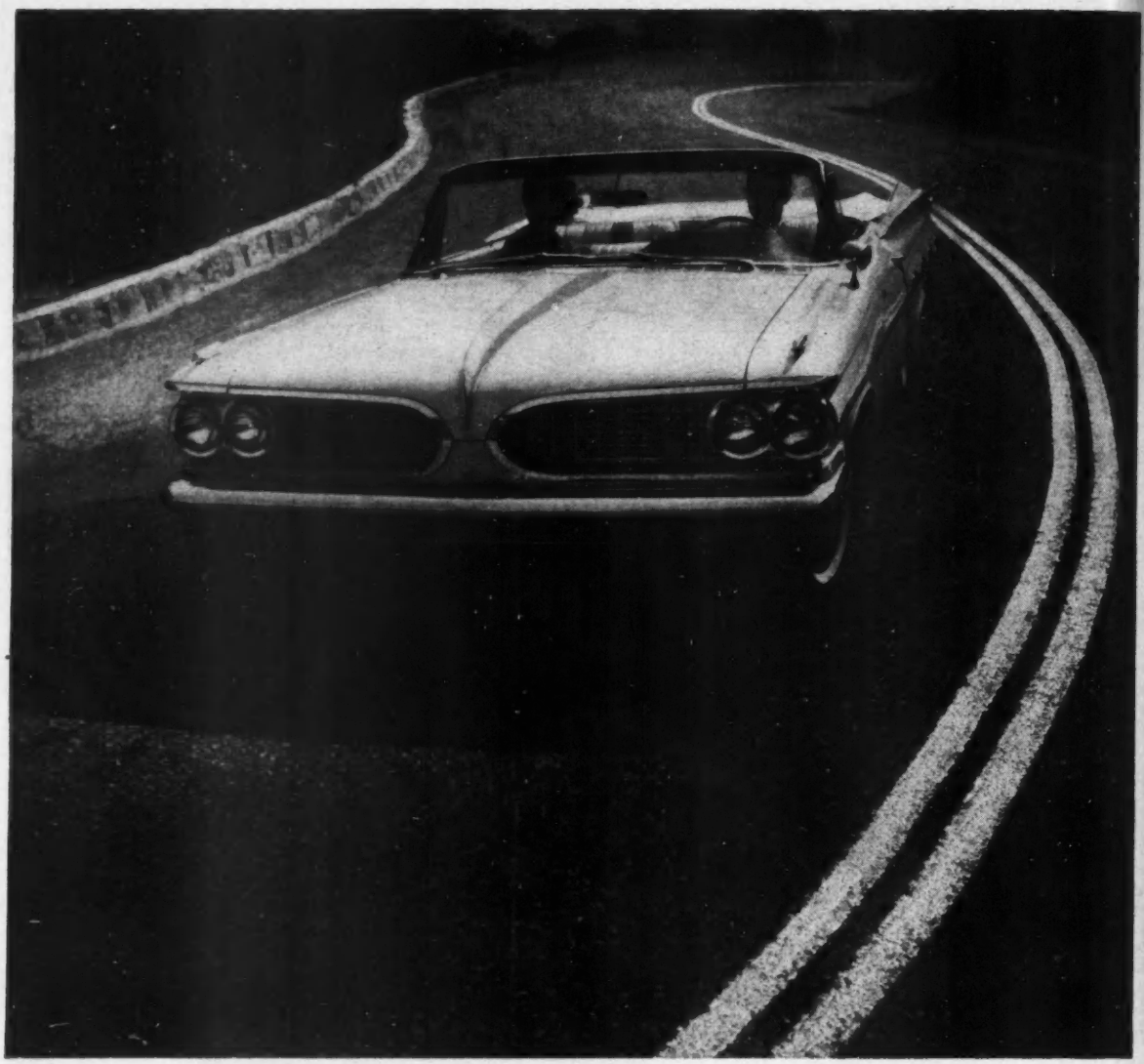

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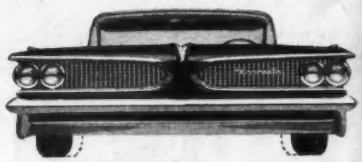

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Overseas | NEWS REPORTS

ENGLAND

BMC is definitely going to launch a new low-priced baby car. Will be a two-door four-seater powered by a transversely-mounted 850cc water-cooled engine driving the front wheels....
Also, BMC is sending two teams to Bonneville. Phil Hill and Stirling Moss will try to exceed 250 mph in the 1500cc, 300-bhp Shorrock-blown MG-A EX-181 (MOTOR TREND, August, page 52); and Carroll Shelby, Ed Leavens and T. H. Wisdom will try to maintain 120 mph for 12 consecutive hours in an Austin-Healey Sprite...Last year, Britain supplied 3% of the total U.S. new-car market, 137,000 units....
Sunbeam Rapiers walked off with the first 5 places in class in the Alpine Rally and were the highest-placed British cars. Layton Sports Cars of Blackpool are withdrawing from development work on their prototype coupe (Jomar) to concentrate on development of their racing cars....
Purchase of two Hillman Huskies sparked a controversy in a New Jersey town. Bought because they were economical, a portion of the town thought it unpatriotic....Another Minx, which participated in the Monte Carlo Rally, a few months later took Grand Prix d'Honneur in a BARC concours....
Stirling Moss tested a modified version of the '59 Vanwall at Silverstone and unofficially beat the track record. A newer engine with slightly decreased bore and longer stroke gave more power, but roadholding needed improvement....
The three-liter Rover is slated to appear with disc brakes in front as a companion to its sustained high-speed performance engine....Triumph has been unable to meet the planned 1200-per-week production of the new Herald. Figure at present is closer to 200....
In order to diversify, Standard-Triumph was negotiating amalgamation with Rover. It didn't go through....Dunlop are incorporating a steel cord-braced tread into their Duraband, newest addition to their line, for competition and high-speed touring....Dowty Hydraulics have developed a hydrastratic transmission for heavy-duty commercial application. It combines the torque multiplication characteristics of a torque converter, the light-load efficiency of a fluid coupling, and the smoothness to apply thrust with infinite evenness. Forward and reverse, and speed controls are off one short lever....The Elva 1100 Mark V prototype for 1960 has a front very much like the Lister-Jaguar, and a rear like the Porsche RSK....The Reliant Regal Mark V Saloon, a three-wheeled 750cc-powered hardtop, is being produced as a true sedan with a stationary roof....

HOLLAND

Winning the first Grand Prix first place ever for BRM, Bonnier drove to victory in the Dutch GP, run at Zandvoort. Average was 93.56 mph.
BRM, noted for sizzling speed on the straights, also has a reputation for breaking up....

GERMANY

Two new Mercedes-Benz models are being offered in the U.S., a four-door convertible powered by a 180-hp engine with intermittent manifold-type fuel injection, and a diesel-powered wagon..

FRANCE

A Renault Dauphine driven by Condrillier and Robin took first in general classification in the Alpine Trials. A D.B. took first in GT category....A new light-duty truck featuring front engine and front-wheel drive will be offered in the U.S. by Renault. This drive was selected to afford a flat loading floor....

ITALY

Fiat-Abarths took five separate victories—one rally and four hill-climbs—in a single day....The new Lambretta motor scooter will have spring suspension and a four-speed synchromesh gearbox....

JAPAN

The glove compartment of the Toyopet Crown Custom contains an electric razor plug-in socket. Toyopet makes a razor to go with it, too. Really....

SWEDEN

Saabs placed first and second in the 10th International Midnight Sun Rally. Interesting, since third place overall finisher was a Ferrari....At Le Mans, another privately-entered 750 GT averaged 80 mph for over 24 hours to finish 12th overall....

THE U.S. SALES PICTURE

Total import sales in the U.S. for first four months of '59 is over 180,000. Volkswagen is 1st with 32,700, Renault 2nd with 23,500, English Ford (all models) 3rd with 14,500. Then come Simca (12,500), Opel (12,000), Fiat (11,800), Hillman (9,000), Vauxhall (7,000), Triumph (7,000), and Volvo (6,200)....

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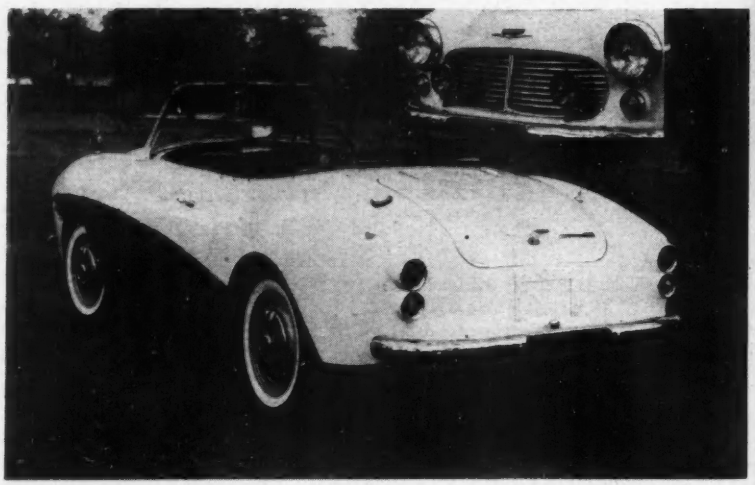
More New Imports . . .

FROM FRANCE: *The Panhard for 1960. The open snout is discarded in favor of the more "smiling" look on this trim four-door front-wheel-drive sedan. Panhard will also crack the sportscar field with a 100-hp roadster, due to arrive in September. Price: about $2700.*



FROM JAPAN: *It's a prototype not yet in production, but Datsun has been at work on a four-seater sports version. According to their figures, engine is 1200cc, 50 hp; gearbox, four speed; weight, under 2000 lbs.; top speed, about 85 mph; price, slightly under $2000 p.o.e.*

FROM RUSSIA: *This is the latest small car from the Moscow Bantam Car Works, a completely new design with air-cooled engine located at the rear. Top speed is about 55 mph, specific fuel consumption about 50 mpg. Features all-independent suspension, semi-automatic gearbox.*

NEW Electronic GLIDE CONTROL*

*Trade Mark

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WASTEFUL PEDAL "PALPITATION" Hundreds of thousands of rpm, gallon upon gallon of gas, *wasted* every day! Figure it out for yourself—engineers estimate waste by multiplying this way: number of miles driven x number of "palpitations" per mi. x useless rpm per "palpitation."

Now, GLIDE CONTROL lets you achieve automatically, with *any* car, exactly what professional "economy run" drivers are famous for—record-breaking fuel savings through precise, even throttle control and fuel-feed! You get any speed you want, without the usual gas pedal "palpitation"—without excessive, wasted rpm—without burning up gasoline needlessly. GLIDE CONTROL is a perfected, precision-made electronic instrument, proven efficient and fool-proof in rigid performance tests by leading engineers.

GREATLY REDUCES FATIGUE

Another constant aim of "pro" drivers is minimum fatigue, and GLIDE CONTROL can promise you this advantage. It ends the tiring, cramping strain of holding right foot steadily on accelerator pedal. The usual tenseness of long grinds on thruways and much of the strain of local hops can be forgotten for good. Wherever you drive with GLIDE CONTROL, you arrive fresh and relaxed.

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Not a "Governor"

Maximum fuel economy is possible only when the fuel flow to carburetor is unvarying. The human foot can't accomplish this—but GLIDE CONTROL can! Maximum comfort and driving ease are possible only when the right leg isn't kept tense, stiff, fixed to the gas pedal. Manual throttle-control can't relieve this—but GLIDE CONTROL can! You get any speed you want with GLIDE CONTROL, and you can hold it for hours without strain. It's not a "governor" in any sense, but an electronic fuel-feed stabilizer. It saves a bundle on gasoline!

25% MORE GASOLINE MILEAGE

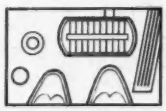
"Pays for itself" is no exaggeration with GLIDE CONTROL. It provides maximum efficiency and uniformity of fuel-feed to carburetor, which results in more ideal combustion and maximum power from every drop consumed. You can't avoid gas pedal "palpitation" when your foot controls gas feed—every fluctuation means wasted rpm, useless gas consumption. But with GLIDE CONTROL, you keep the fuel-flow uniform and any gas will produce more miles per gallon. It increases gas mileage up to 25%—pays you back its full cost within a few months!

SAFE TOE-TIP CONTROL

You are in command every split-second, with GLIDE CONTROL. Hands never leave the wheel, eyes never leave the road—because this speed stabilizer is "cut in and out" by your toe-tip, *not* by a hand switch on the instrument panel. It works with a left-foot floor-button placed a little to the right, and above, the light-dimmer button. Touching the brake pedal "cuts it off" automatically. It requires no change in driving habit, no unfamiliar footwork. Driving with GLIDE CONTROL is as simple, natural, and familiar as dimming the headlights.

HOW IT WORKS

You accelerate to any desired speed, then "cut in" GLIDE CONTROL with your left toe. It will hold your speed at the predetermined rate indefinitely. Once speed is set, your right foot is free, relaxed, and just that much more "ready" to hit the brake pedal when need be. GLIDE CONTROL holds speed constant by precisely measuring fuel-flow. It functions until you either touch the floor-button again, or apply the brakes. The instant you touch the brake pedal, GLIDE CONTROL "cuts out" and throttle control becomes manual.



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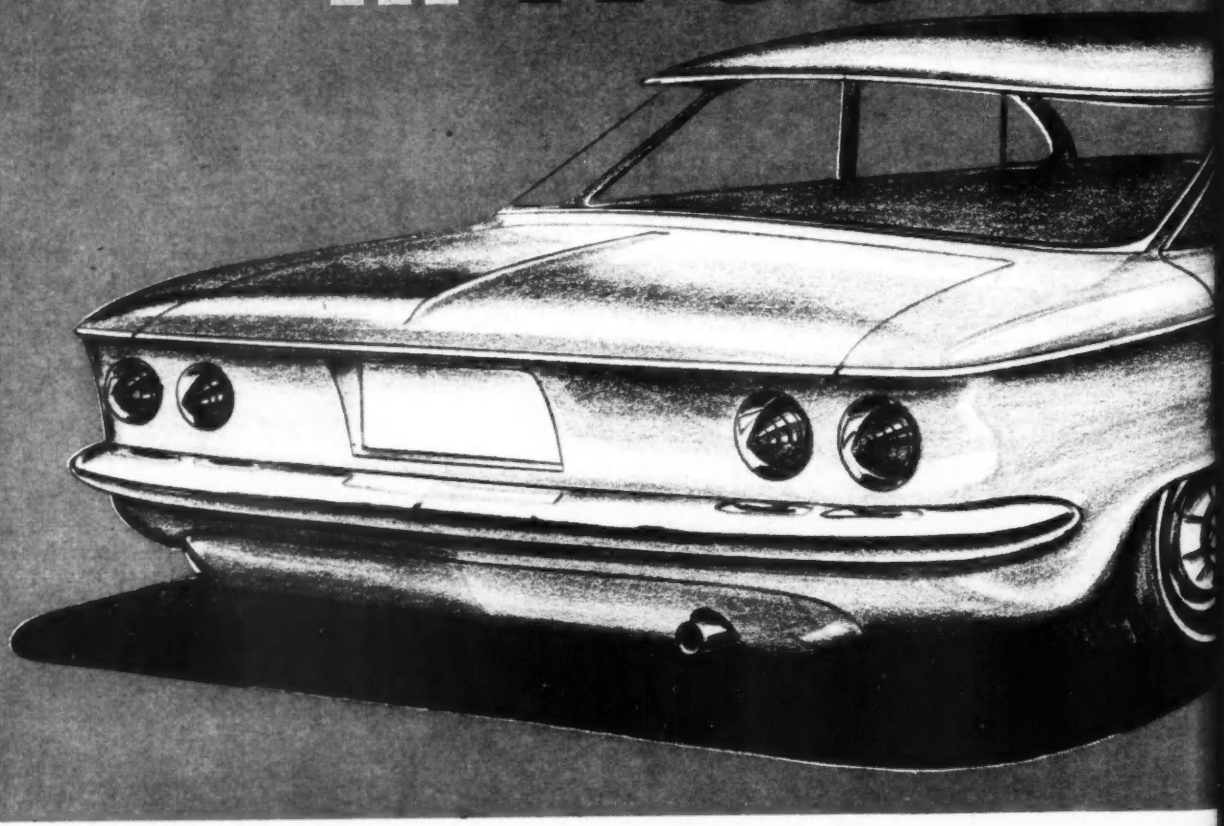
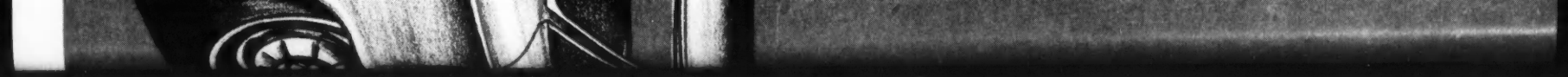
DETROIT'S plans for YOU in 1960





In our annual preview of the new cars, we take you behind the styling curtains and into the engineering shops to show you what you can expect from Detroit in '60. Probably the most intriguing news is about the new compact cars. But, there's lots more in this "Year of Wide Choice."

by BILL CALLAHAN Detroit Editor

CALL IT A REJUVENATION, revolution, reversal of trend or just plain revival of competition—whatever tag you place on the industry's new direction for 1960, it nonetheless offers the American car buyer a much wider choice of cars to pick from than has been offered in years.

When first I started chronicling the events in this industry in 1925 there were 54 companies catering to the whims of American motorists. Among them were such venerable names as Ajax, Auburn, Apperson, Chandler, Locomobile, Pierce-Arrow, Rickenbacker, Haynes and countless others. Corporate integration and cold, hard competition whittled down the list until this year only 16 nameplates remain. The choice among series of cars marketed under the various names then became limited largely to a choice of powerplants, interior and exterior trim and an assortment of special equipment and accessories. Today, buyers will have a choice among 22 nameplates and close to 200 selections if series and body types are considered.

For 1960 we feel the industry is making a step forward by apparently going back. Most dramatic change, of course, will be the addition of the Falcon by Ford, the Corvair by Chevrolet and the Valiant by Chrysler. These new cars, brand-new from tires to top, when coupled with existing Rambler, Rambler American and Studebaker Lark, provide a choice among six smaller, lighter cars. These cars, while aimed at the two-car family, are equally suitable as the one-and-only unit of transportation.

In addition to its Valiant, Chrysler will increase its coverage of the so-called low-priced market with the addition of its Dart model to the Dodge line. The Dart, in design and price, will be competitive with Ford, Chevrolet, Plymouth and Edsel. This makes a total of six cars to choose from in the low-price bracket as against three in previous years—if we include American Motors' Ambassador.

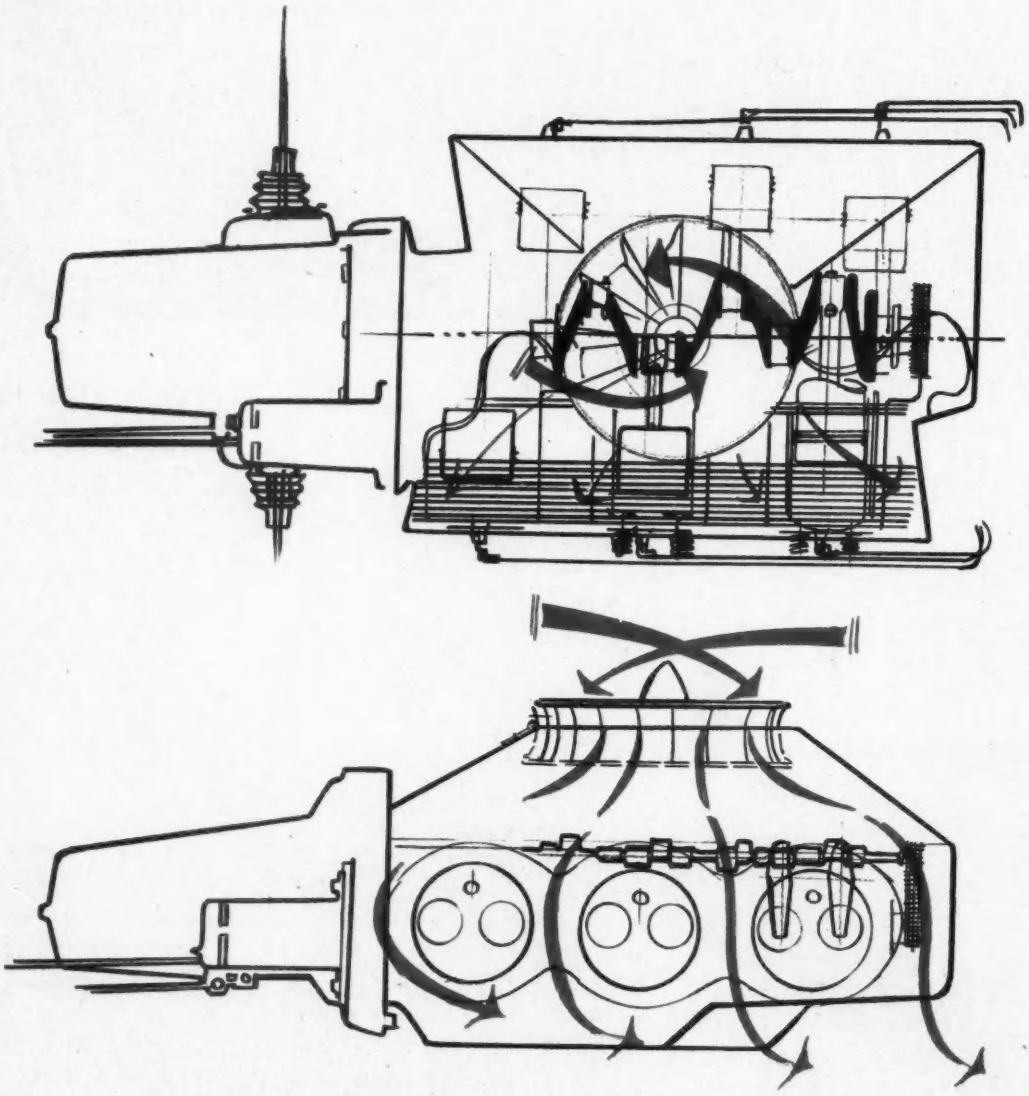
From a styling standpoint, the cars for 1960 will be generally quieter in appearance. The all-out attempt to imitate rockets and space machines has been tempered to a large degree.

continued

The drawing here and the one at top of the page are based on studied knowledge of Chevrolet's styling ideas for their new compact car — the Corvair. Some details may be changed for actual production.

ILLUSTRATIONS BY CHARLES PELLY AND BOB CUMBERFORD

DETROIT'S plans continued



Opposed six-cylinder aircooled engine features pancake design and bears a striking resemblance to popular light aircraft powerplants. Corvair engine will have a horizontal blower and a ducting system to steer air over cooling fins on the aluminum cylinder barrels. The blower is controlled by a thermostat and operates only when engine heat requires it.

CHRYSLER'S CHANGE to unitized body construction for all its lines (except the Imperial) has enabled it to return to the comfort of chair-height seats and flatter floors. At the same time they still retain a roofline in the neighborhood of 55 ins. The front cornerpost has been changed to eliminate the slight dogleg which resulted from the earlier wrap-around windshield. This makes for easier entrance and exit to the front compartment and does not reduce glass area or forward vision.

THE FORD LINE is not changing across the line, though Ford and Edsel will have entirely new bodies. The normal body-and-frame construction will still be used, despite rumors to the effect that Ford was switching to unit bodies.

GENERAL MOTORS CARS all retain the same basic bodies as in 1959, with changes limited largely to sheet metal. All cars will have new grilles, new headlight and new tail light treatments.

Economy will be the keynote, even among the larger cars, for 1960. In most cases this will be obtained by engine refinements and reductions in compression ratio, enabling the engine to operate on standard grade gasoline rather than the higher-cost ultra grades. Chrysler, however, will add two new six-cyl. ohv engines which will be used to power the Valiant and Plymouth; they will also be available in the Dodge and Dart models.

The only aluminum engine to make its appearance this year will be the aircooled, flat six used in the Corvair. One company will offer a new-type tuned-tube manifold as optional equipment, which is said to greatly increase torque while at the same time giving better economy.

In performance the 1960 lines will remain about the same as in 1959. The trend toward increased horsepower seems to have run its course, but the current trend to economy will not materially affect the ability of cars to get up and go. In standard size cars the emphasis has been placed on quality control and better ride.

COMPACT CARS

Entry of the Big Three into the compact car field will give a definite answer as to the real depth of this market. Ford's Falcon and Chrysler's Valiant are entirely new, but are scaled-down versions of standard BIG cars. The Corvair introduces some entirely new concepts so far as American manufacturers are concerned (see conjectural drawings on pages 20 and 21).

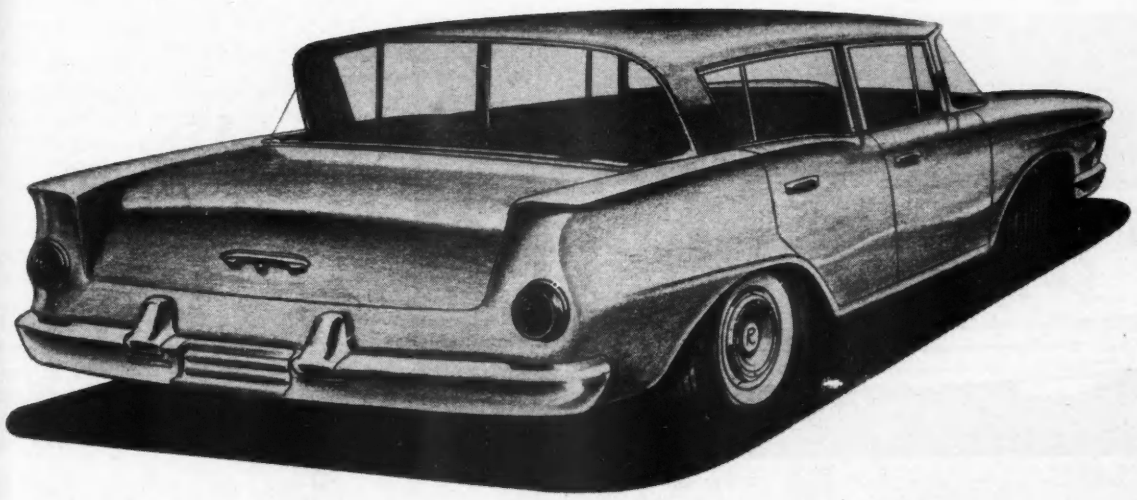
The Corvair will be powered by a new six-cyl. aircooled flat aluminum engine of 90 hp, using cast-iron cylinder sleeves. It will be cooled by a horizontal blower or fan which is thermostatically controlled so the fan operates only when needed (see illustration, page 22). The engine will be mounted behind the rear axle and drives through an aluminum-case transmission just ahead of the axle. Short shafts extending from the differential supply power to the independently-sprung rear wheels using coil springs.

The body will be unit construction, with the frame as an integral part of the body. The gasoline tank is mounted forward, in back of the front suspension (said to offer protection in event of collision). Also, this design is said to put the fuel lines on the cool side of the engine, reducing evaporation. The rear engine placement permits designing a body with flat floors with no hump or tunnel in the center. Luggage is carried in front above the gas tank. Wheelbase is about 108 ins., and the overall length about 183 ins.

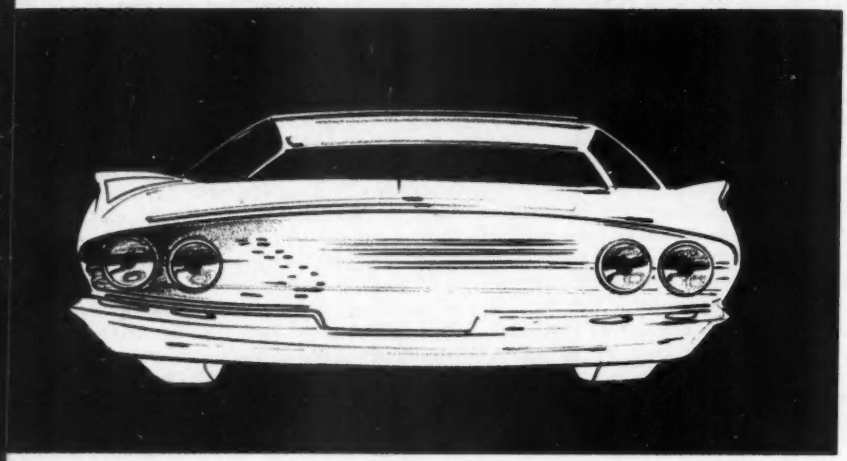
The Corvair seats six passengers in a two-door sedan. A four-door will follow after the first of the year. Because of its aircooled engine the Corvair requires no water connections, water pump, radiator or anti-freeze and there is no boiling. Overall weight is put at around 2400 lbs., which is distributed about 40 per cent front and 60 per cent rear. For this reason special "long cord" tires are used with 15 to 16 psi pressure front and 26 rear, using 13-in. wheels. Seating and luggage location are said to be such that the weight ratio front and rear changes very little with the car loaded or unloaded. The light weight on the front wheels provides light, positive steering.

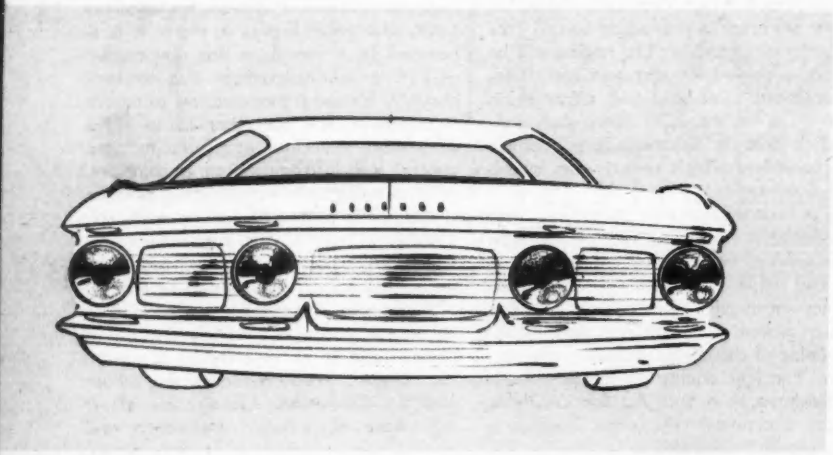
The Falcon, a more conventionally-designed car, is based on a 105-in. wheelbase and measures 181 ins., overall. *(For a story on how the Falcon was styled, see page 38. Ed.)* Coil springs are used in front, with semi-elliptics in the rear. It is powered by a six-cyl. in-line ohv engine of 144-cu.-in. displacement that develops about 90 hp and is mounted low to reduce transmission and driveline hump to a minimum. Interior appointments are tasteful and instrumentation is complete. A hand choke is provided. Trunk is quite spacious and seats will accommodate six. The car is only 52 ins. high and 13-in. wheels are standard. Two- and four-door sedans and station wagons will be offered.

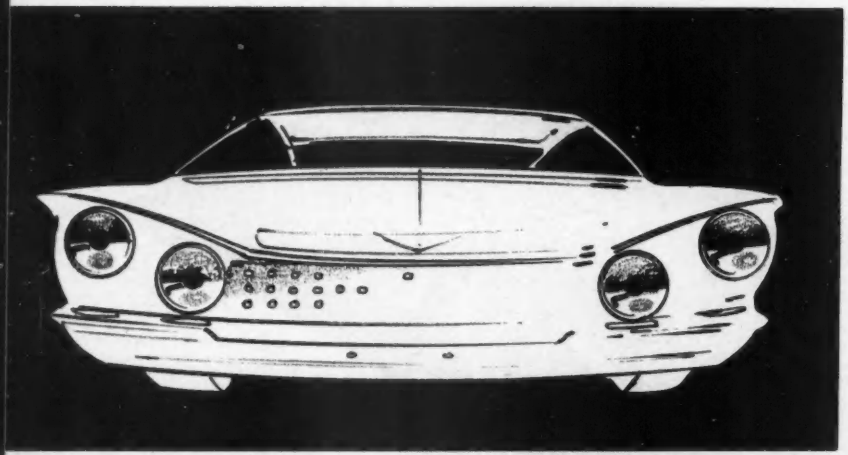
The Valiant is generally understood to be somewhat longer than the Falcon or Corvair and to be powered by a six-cyl. ohv engine, probably developing about 100 hp. Like other Chrysler models it will have unit body construction and



Basic body shell for American Motors' Rambler 6 and Rebel V8 will be restyled somewhat, with no mechanical changes contemplated.







Nothing new is planned in headlights for '60 but units will be juggled and respaced to change them from previous models. Some hoods will slope down noticeably, aiding driver vision.

DETROIT'S plans

continued

probably will use torsion springs in front with semi-elliptics in the rear. The Valiant is not expected to make its debut until early November, though the date could be moved up to mid-October. Two- and four-door sedans and station wagons will make up the Valiant lines.

American Motors will meet competition from the three newcomers in the field by rather drastically restyling both its Rambler Six (108-in. wheelbase) and American (100-in.) models. The Rambler Six will be more changed, but the basic body shells now used in both models will be continued. *(See conjectural drawing on page 23. Ed.)* The Rambler Six body will also be used on the Rebel models, which are equipped with a V8 engine. There will be no major mechanical changes in keeping with the notion of holding annual changes to a minimum.

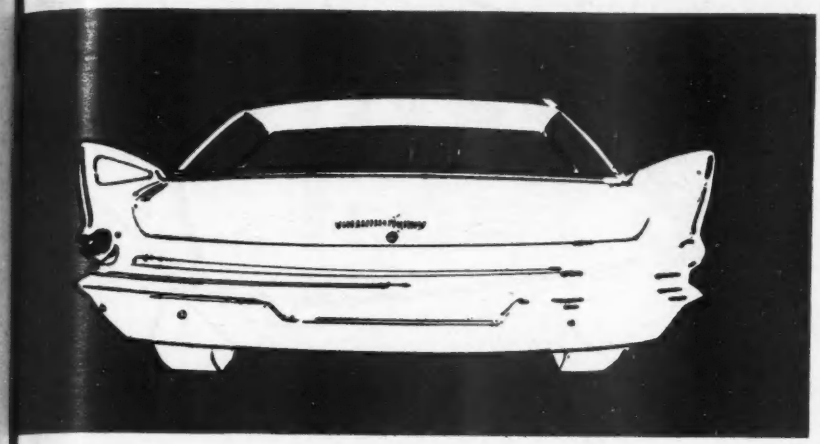
Only recently Ramblers incorporated a new lubrication-free front end which was made as a running change during production. A new four-door model will be added to the American line and engine modifications both in the flathead six used in the American and the ohv six used in the Rambler Six are aimed at greater economy of operation. These are refinements rather than any basic changes.

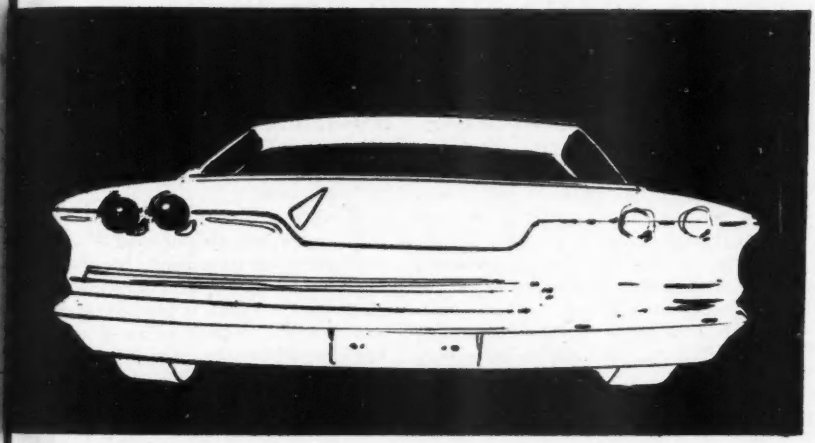
Studebaker Larks will be slightly restyled with new grilles but no basic changes are planned. A new convertible model will be added to the present two- and four-door sedans and station wagons.

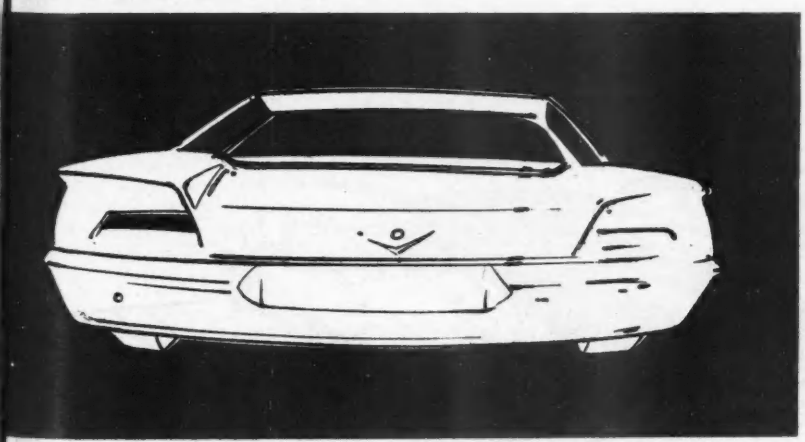
POPULAR SIZE FIELD

Plymouth, with its new unitized body that eliminates the frame, will probably offer the greatest engineering change in this field. New, sculptured fenders result in quite a change in appearance, although the rear fins are still retained as an identifying feature. A new, six-cyl. ohv engine will be available, along with the regular series of improved V8s. Swivel seats *will be* continued.

The Dart, starting in the low-price field as part of the Dodge line, is probably even more appealing to the eye than the







Stylists have been keeping their fingers on the public pulse and, in apparent answer to buyers' demands, have de-emphasized fins on the '60 cars—some have been flattened into horizontal shapes, others have disappeared altogether. Deck treatments will feature sloping and sculptured styles. Most tail light treatments will be more subdued than they have been on '59 cars.

regular Dodge. Its modified fins will give it a distinctive appearance. It will have a slightly more powerful version of the Plymouth ohv six, a unit body and a 118-in. wheelbase.

Ford and Edsel for '60, with their new bodies, are quite a departure from past styling, with more rounded lines being used. There will be a Fairlane and Galaxie series, with one Galaxie probably featuring a fastback design in addition to the model with the cantilever roof. The windshield on both cars will be modified to the extent of eliminating the dogleg cornerpost that hinders entry and exit (see drawing, page 26). Both cars appear lower than in '59 and new seats allow for slightly greater headroom and legroom. Six- and eight-cyl. engines will both again be available. Horsepower will remain about the same, with the emphasis placed on economy, and, as has been previously reported in these pages, the Edsel "horse-collar" grille is going the way of the horse-and-buggy. In its place is a grille that will make you think, "Now, where have I seen that before?"

Chevrolet will be facelifted for '60, with the fins a bit flatter on top, with less sweeping effect and held more closely to the body sheet metal. The "cat's eye" tail lights will be dropped in favor of a triple-light arrangement. Basically, the body remains unchanged and there have been no reports of major mechanical changes except for general refinements.

MEDIUM FIELD

Buick, Olds and Pontiac all have been restyled, although the basic body remains the same. All are toned down in appearance, using less trim that is better placed. Buick fins will be stubbier than in 1959, but the change is less marked than in other GM lines. Buick will offer a unique exhaust system. Olds will have no fins as such and the booms of '59 have been replaced by a smooth body line sweeping front to rear. Pontiac has dropped its V-type fins. All cars will have new grilles, though Pontiac's is the most changed. A new, slightly smaller transmission has enabled these divisions to drop the transmission/driveline tunnel about an inch. All cars will offer economy engines (V8s) with somewhat lower displacements than last year.

Dodge, DeSoto and Chrysler lines will all offer unit bodies with flatter floors, higher seats and more leg- and headroom. Overall size of the cars will be about the same as in 1959. Transmission and driveline humps will be lower. New luminescent instrument lighting in the Chrysler, in which glowing discs replace bulbs, gives efficient light without glare.

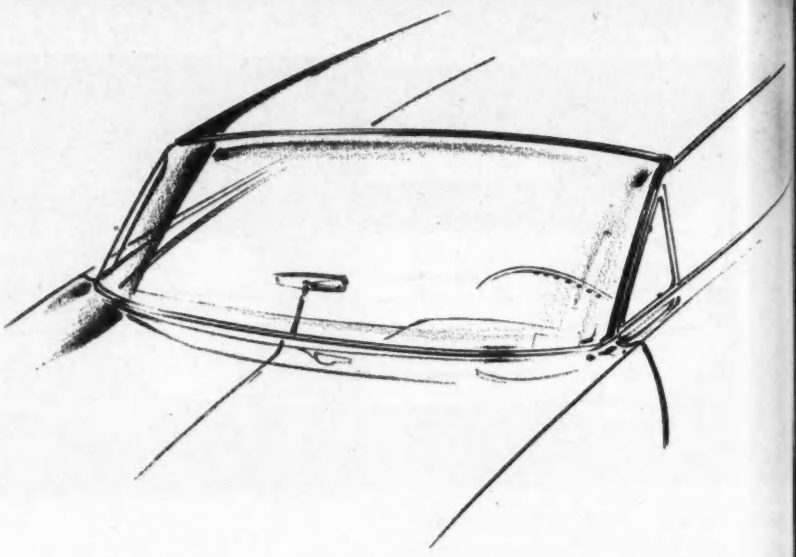
Mercury will be greatly changed for '60, with less square lines, though the same basic body is being continued. Doors will

extend more into the roof. In overall size there will be little change from '59. The entire line for 1960 will share the same wheelbase of 126 ins., and the two-door station wagon has been dropped. Mechanical changes have been held mostly to refinements all aimed at better performance, quieter operation and higher quality.

Studebaker Hawk will be served up this year with little or no change in either styling or mechanical features. Emphasis at Studebaker is being placed on the Lark series.

LARGE CARS

Cadillac, Lincoln, Continental and Imperial will not be greatly changed for 1960. Cadillac will have modified fins, a lower transmission and driveline hump. Others will retain basic lines with more or less rearrangement of trim rather than basic sheet metal changes.



Ford and Chrysler lines for '60 will have vent pane in door, eliminating the objectionable corner of the windshield that often interfered with easy entrance and exit.

SPECIALTY CARS

Among the more-or-less specialty cars such as T-Bird and Corvette the changes for 1960 will not be too marked. T-Bird will sport a new grille and will have a little more flare, while Corvette will have a little more racy flavor. Mechanical changes are being held to refinements of present designs to provide better riding, handling, quieter operation and almost trouble-free performance.

SUMMING UP

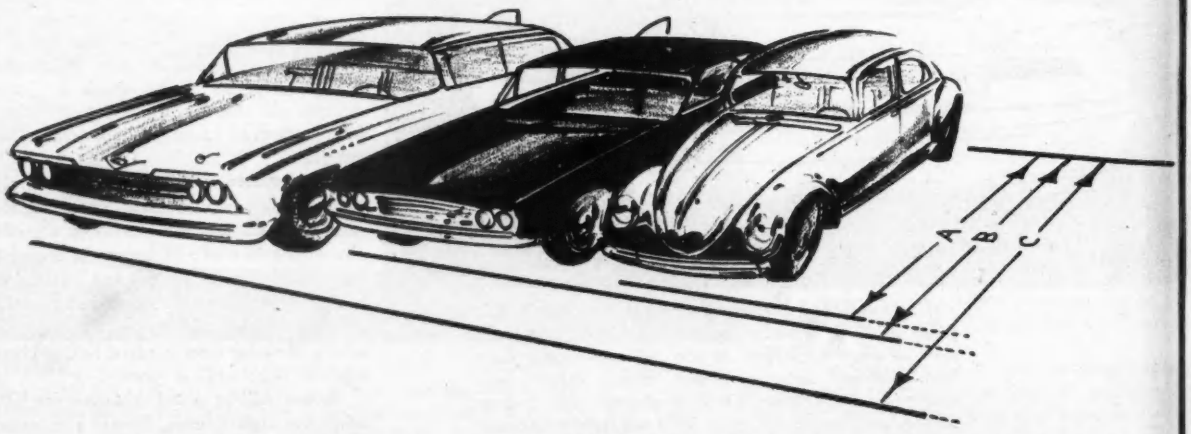
Except for some rather marked changes in styling, most lines will retain the same series and model designations of 1959. Mechanical changes will be restricted pretty much to eliminating difficulties that have resulted in owner complaints in the past. There will be a trend toward unitized body construction and greater economy of operation. There will be new ideas in exhaust line and muffler setups. Some cars will offer tilt-type speedometers that can be adjusted to the height of the driver. Some will revert to dial-type speedos rather than the ribbon type. Basically, the industry has been aiming at improvement, rather than innovation, for 1960. On the other hand, the addition of three small-car lines gives the prospect of much wider choice of cars to pick from in the coming year.

BUY NOW OR LATER?

The big question now, as always, is "Should I buy now or wait for the new models?" The answer to this is, "Do you want a new car at the lowest possible price where the question of savings overbalances a desire for latest gimmicks or latest styling?" If you are more interested in saving than style, the answer would be to buy now.

When new models are announced, current models become one year older and are depreciated accordingly. End runs are likely to be freer from bugs than early production cars. But, as pointed out, 1960 models in the standard cars will represent refinements of present designs rather than bold innovations and therefore this factor this year may not be so important.

Weighing all angles one can argue as strongly for one side as the other. There will be a wider choice in the next month or two, but at present you may be able to pick up some real bargains.



Compact car's (B) practical size of 180-183 ins. overall length falls between VW's 160 ins. (A) and Cadillac's 225 ins. (C).

ENGINES- front or rear?

1960 will be a year of lively controversy on this subject. Here's a preview of some of the arguments—plus a look back at two early experimental models.

CHEVROLET'S PLAN to produce the Corvair with a flat, aluminum engine mounted in the rear has stirred up one of the biggest Detroit battles of recent years. Ford is taking dead aim on the question with TV commercials, likening a rear-engine car to an arrow with the weight in the rear. (!) Chrysler is using their Simca ads to air the question, offering a free booklet on "The Advantages of Front-Engine Cars" and openly refers to their upcoming Valiant as having the "engine up front, where it belongs."

Competitive tom-tom beaters are hammering out a tattoo of terror, declaiming that rear-engine design, except in very abbreviated models like the Volkswagen, Renault and Fiat 600, is inherently unstable and therefore has very unsatisfactory, if not downright dangerous, handling characteristics. The advocates argue that the weight of the engine in the front creates much better directional stability as the lighter rear end is inclined to follow the direction of the mass of weight in front.

This weight distribution, they opine, creates a desirable degree of understeer, whereas when the weight is placed in the rear the car develops oversteer characteristics which cause the rear end to want to change places with the front end when cornering on slippery surfaces or riding on high-crowned roads.

In March of this year, a group of engineers from Rootes Motors of England presented a paper before the Society of Automotive Engineers in Detroit, the conclusion of which was that rear-engine design can be applied successfully only to smaller-type cars of less than 100-in. wheelbase or 1-liter (62-cu.-in.) displacement.

Claim the proponents of front engine cars:

1. Placing the mass of weight in front gives the car better directional stability, as the lighter weight rear is prone to follow the heavier front end.

2. In side or crosswinds the mass of weight up front causes the car to continue in the direction in which it is aimed with less wavering or yawing.

3. On slippery surfaces or under hard braking the front engine car has less tendency to change ends as the kinetic energy developed in the heavier front end is still the governing factor in directional control.

4. In event of head-on collision the driver and passengers are protected by the mass of weight ahead of them, rather than have it come tumbling after them.

Piqued by this open criticism from several sources (Volkswagen has been notably silent), Chevrolet staged an unprecedented press conference early this summer at which it unlimbered its heavy guns in the form of able and amiable Maurice Olley, an outstanding authority of chassis and suspension design, who is now in retirement. Olley pooh-poohed the idea of directional instability in a rear-engine car and stated that overall chassis design is equally important.

He pointed out that in the normal American front-engine car the unladen weight of the vehicle is divided about 55 per cent front and 45 per cent rear, but since the payload is located toward the rear the laden car in most cases reverts to about 50/50 distribution. Olley also stated that in the smaller front-engine cars with an initial 55/45 distribution a payload of 800 pounds can increase the weight on the rear springs by as much as 66 per cent, which also can create a serious condition of oversteer.

In the case of station wagons, Olley said, the normal weight distribution would be 40/60 and directional stability is maintained by increasing the rear tire pressure.

In the Corvair design, Olley said, the weight distribution was deliberately placed at 40/60 with the vehicle unladen. The design of the independently sprung rear axle is such that better rear-wheel steering characteristics are obtained. This is further enhanced by using tires of "long cord" construction which also provide better directional control. The long cord design means that the cord which forms the body or carcass of the tire is wrapped at a wide angle more nearly parallel to the tread of the tire. Coupled with this is the fact that the recommended tire pressure in the front will be 15 to 16 pounds, while recommended rear pressure is 26.

Passenger and luggage space has been located in such a way that the initial distribution of 40/60 will be maintained when the vehicle is fully loaded. This stability of distribution, he maintains, provides very stable handling characteristics under all conditions. Olley agreed, however, that without the lighter air-cooled aluminum engine (which weighs about half as much as a standard V8) the Corvair design would not have been feasible

He also contended that the criticism of the rear-engine design from a safety standpoint when a car is involved in a head-on collision was rather academic, since occupants of a car which struck with sufficient impact to tear loose the engine would probably not have great concern about what happened.

In criticism of the front engine placement, Olley said, "In an unladen car with the mass of weight in front, hard braking further shifts the weight mass forward and in some cases almost unloads the rear wheels. This," he added, "reduces the braking effort of the rear wheels almost to a vanishing point. In the rear-engine design with the engine mounted behind the rear axle, weight shift on braking is practically nil, thus providing efficient braking on all four wheels. This is particularly true in smaller, lighter cars."

With this much pre-introduction we can expect the controversy over front- or rear-engine placement to wax warmly in the weeks ahead. And considering the caliber of engineers who have aligned themselves on both sides of the argument it is impossible to say who is right or who is wrong—if either side is.

Without trying to argue the question at greater length, pro or con, let's look back at several rear-engine prototypes built by the late William Stout. Probably one of the staunchest advocates of rear-engine designs, Stout brought out his first prototype in 1934, a revised "production" model in 1935 and a post-war luxury model in 1946. (All, incidentally, were called Scarabs.) None ever got into any real production.

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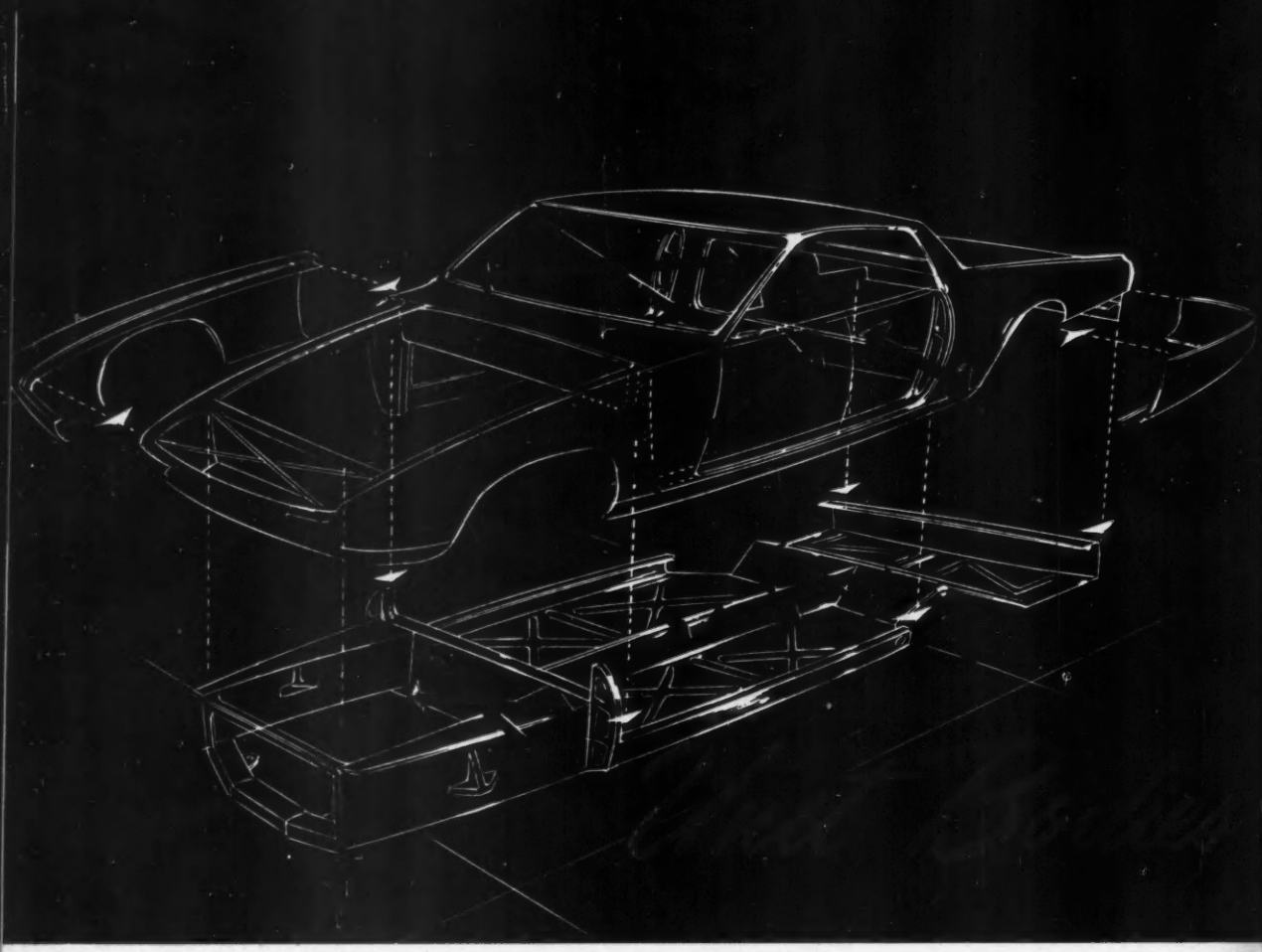


by Dean Parker *Illustrations by Charles Pelly*

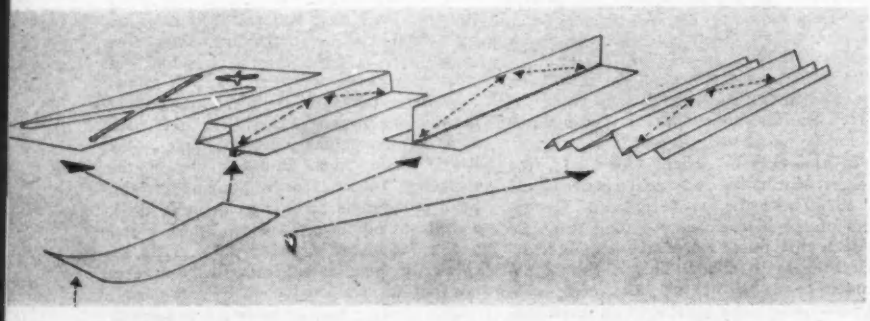
CHRYSLER CORP. ENGINEERS are bringing out a new line of bodies for their 1960 models that they are confident will obsolete conventional body construction methods overnight. They will feature a highly advanced form of "unit" construction—where the body is welded up from panels and braces into a sturdy box unit, without any separate sub-frame.

Auto engineers have been arguing the pros and cons of unit body construction for 30 years; for every advantage there always seemed to be at least one disadvantage. But the Chrysler people think they have the answer now. They're sure they can offer you a tighter, quieter, longer-lasting body than you have ever been able to buy in a Detroit product before—and one that does not kill compromises on style, weight or cost. If they're right they could revolutionize the industry.

In view of these developments the editors of MOTOR TREND feel this might be a good time to take another careful look at this whole unit body question.

WHAT IS UNIT CONSTRUCTION? Ever since the automobile was invented, most cars have been built up on a heavy channel iron chassis frame to which the body, engine, running gear and all major subassemblies are bolted. This frame is literally the "backbone" of the car. The layout is reasonably economical to mass-produce, is quite solid and durable, allows relatively inexpensive annual body changes, and is generally pretty practical all around for Detroit requirements.

But, this is *not* the modern way to build a vehicle. Technological developments in the last 25 years, especially in the aircraft field, have shown us that we can save a lot of weight and material—and still get a more rigid structure—if we distribute the operational loads and stresses *over the whole structure.* This is the principle of the modern "monocoque" airplane wing and fuselage. It's the principle of a



Great rigidity can be given to thin sheets of metal by folding, creasing or crowning. When combined with upper body that is also stiffened by these methods, entire structure is stronger, lighter, does not twist.

unit car body. With a conventional frame-body combination the *body* actually contributes most of the overall stiffness of the car structure. The 300-lb. frame is mostly so much dead weight. What's worse, with the body mounted on the frame through flexible connections (rubber pads), the total stiffness of the car structure is not necessarily the sum of the individual frame and body stiffness figures. In other words, we've got a lot of iron here that isn't doing much work.

With unit construction we throw out the separate sub-frame. Here the whole body is welded up from a number of stampings and box or channel section braces into a solid box unit, with the engine and running gear attached directly to the box. Theoretically the whole body from floor to roof is stressed in resisting bending and twisting forces, and there's no wasted strength due to flexible connections between component parts. On paper we save weight, cost of materials—and the resulting structure is theoretically a good deal more rigid than a comparable frame-body combination. Furthermore, when the principle is applied to a car there are a couple of bonus advantages: Without the underframe it is easier to lower the floor line and get lower bodies; and, the stiffer overall structure can give an entirely new feel to the body—a solid, tight feel, free from the usual squeaks and rattles and shakes we've learned to expect from a mass-produced automobile.

It's really the only way to build a body —at least on paper.

PROBLEMS As usual, it's not all gravy. There have traditionally been three major drawbacks to unit construction in our auto industry—and apparently they have been serious enough to keep all but a few companies away from it for 25 years: 1) Underbody corrosion caused by street salt in winter has tended to seriously weaken the strength and stiffness of unit bodies after a few years; 2) due to the lack of any really scientific method of *designing* a unit body to distribute the stresses evenly over the structure, these bodies have generally had a lot more beef and weight than was theoretically needed; and 3) basic tooling costs and the costs of annual "facelifts" tend to run higher with unit bodies, not to mention the fact that any switch from frame to "frameless" construction will require a complete rebuilding of body and assembly plants.

But now let's comb some current production literature—and tap the crystal ball a bit—to see how American Motors and Ford Motor and Chrysler are facing these traditional unit body handicaps.

The corrosion problem has been virtually licked in just the last two years. American Motors made the big breakthrough when they started dipping complete bodies in a rust-inhibiting zinc-chromate-base primer paint (starting with '58 models). Prior to that unit bodies had been sprayed with a Bonderite (phosphate) solution before painting. This did a job—but you can't spray into the inside corners and crevices, which left vital body points wide open to corrosion attack.

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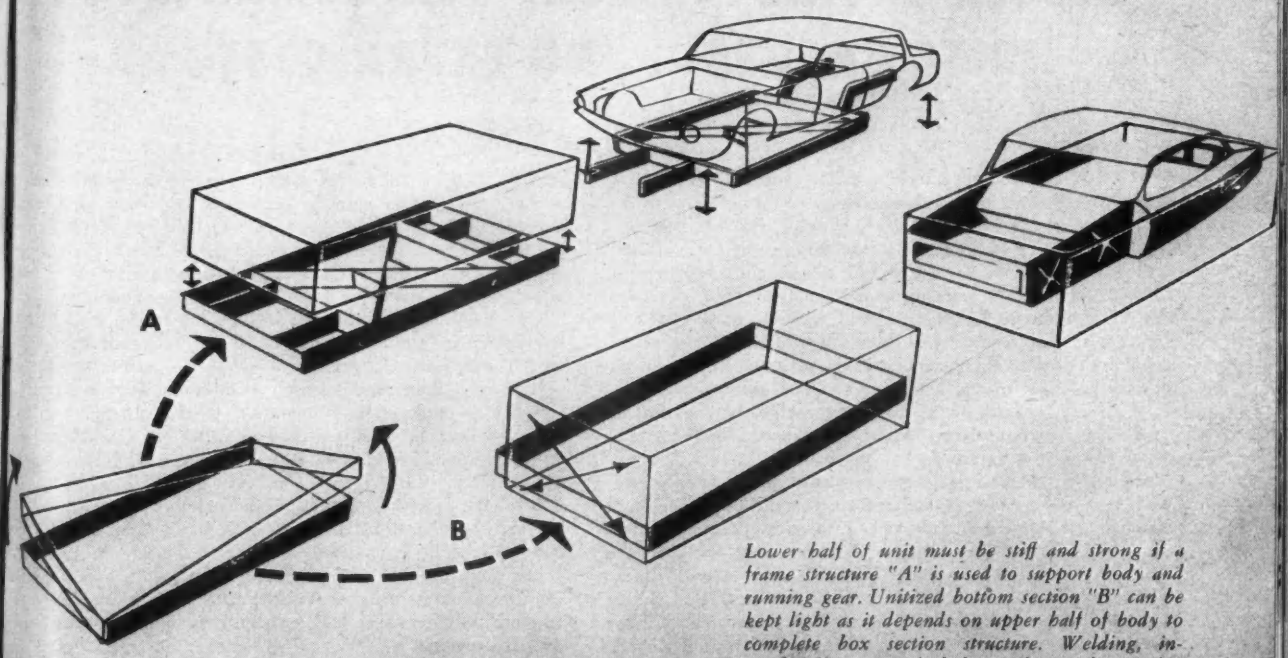
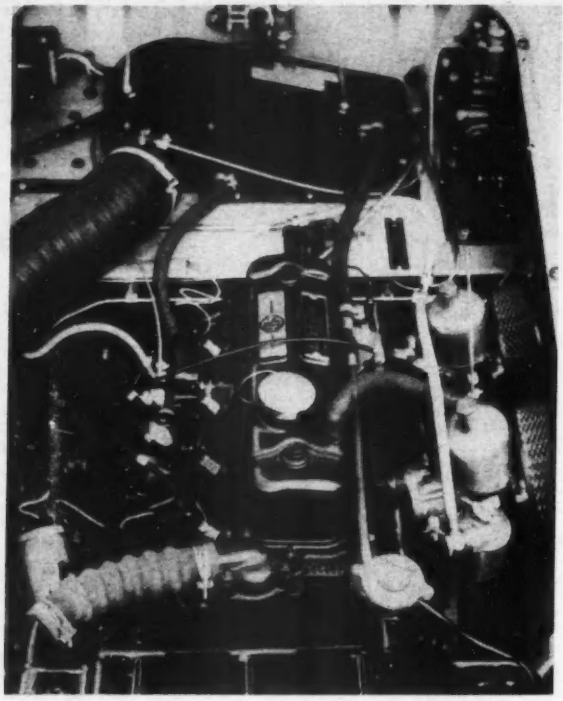
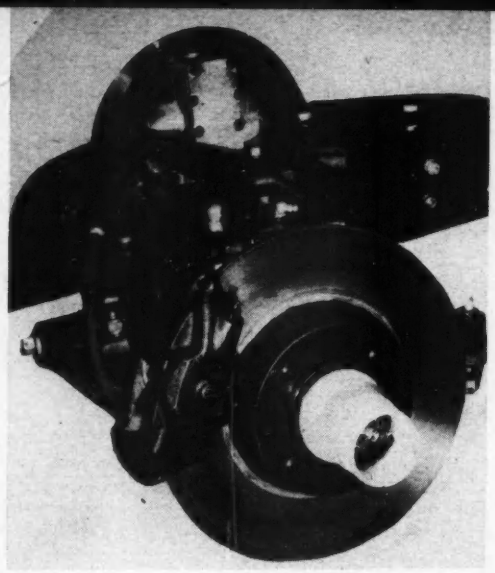
What...? Why...? How...?



Lower half of unit must be stiff and strong if a frame structure "A" is used to support body and running gear. Unitized bottom section "B" can be kept light as it depends on upper half of body to complete box section structure. Welding, instead of nuts and bolts, reduces the rattles.





Lockheed 11-in.-diameter disc brakes on front give stopping power to match the increased engine output. Caliper position and cut-out permit easy inspection.

Larger bore increases displacement to 1588cc (96.9 cu. in.), horsepower to 79.5 @ 5600 rpm. Compression ratio is still 8.3:1; carburetion by two 1½-in. SUs.

by Gordon Wilkins European Editor

BIGGER ENGINE . . . MORE PERFORMANCE . . . DISC BRAKES . . . NO EXTRA COST . . .

THE MG-A, this country's most popular sportscar, gains extra performance and increased stopping power at no extra cost in its latest version, the MG-A 1600. Engine size has been increased to 1588cc (96.9 cu. in.) by enlarging the bore, making it the same size as the Twin-Cam unit. Maximum net power (as installed in the car) goes up to 79.5 bhp at 5600 rpm and maximum torque to 87 lbs.-ft. at 3800 rpm. An increase of 6½ per cent in displacement has therefore produced a rise of 10 per cent in power and 12½ per cent in maximum torque, giving quicker acceleration and a maximum speed around 100 mph. Full use can be made of the extra performance without fear of brake deterioration, thanks to new Lockheed disc brakes of 11-in. diameter at the front.

Externally, there is little to distinguish the more powerful MG-A: a 1600 badge behind the air exit grilles on the front fenders, new side lamps and amber turn indicators combined in one unit, and new-style tail lights and turn indicators. The open two-seater has more convenient rigid side curtains with sliding plastic windows; when not in use they are stowed in a neat envelope which hangs behind the seats. A detachable hard top is available. It is also offered as a fixed head coupe with glass side windows.

The larger cylinder bores have been obtained by siamesing the first and second pairs of cylinders, eliminating water spaces between them as on the Twin-Cam. Despite the extra cylinder volume, compression ratio has been held to 8.3 to 1 and valve sizes are unchanged, as they were already big enough. Big ends have lead-indium bearings; mains are white metal. Carburetors are two SUs of 1½ in. There is no change in gearbox or axle ratios. Normal final drive is 4.3 to 1; 4.55 is available to order.

Optional items at extra cost include the special competition seats which are already ordered on 50 per cent of all Twin-Cam models and nearly 70 per cent of all coupes. Other options: a very effective heater and defroster, twin horns, windshield washer, cold air ventilation, competition windshield, roll bar for driver protection, headlight flasher switch and relay, cockpit cover, adjustable telescopic steering column and center lock wire wheels.

With the cooperation of the BMC I was able to pick up one of the new MG-As at Lyon, France and give it a hard 250-mile run over the Route Napoleon—down to the Riviera and back. It is a route which begins with some fast straights but soon gets involved in interminable twists, turns, climbs and descents through the mountains, and it showed the qualities of the new MG at their best.

It is better balanced and nicer to handle than ever. The chassis has a margin of roadholding which can use all the extra power and torque and it never seems to be an embarrassment.

Slipping into second for the sharp corners, you can really send it tearing around, with a sharp bark from the exhaust. It set the mountainside echoing as it snarled up the Alpine slopes in third. Taking the tachometer to 6000 rpm, where the red warning sector begins, maximum speeds in the gears are: 1st—27 mph, 2nd—44 mph, 3rd—71 mph.

Although the car was not yet fully free, it averaged about 46 mph over the difficult mountain section from Digne to Castellane, and the brakes were given a real workout on the tortuous descent of the Col des Leques, well known to Monte Carlo Rally drivers, but they showed no sign of fade or even of any appreciable increase in pedal travel. These new Lockheeds are progressive and need no heavy pedal pressure. At low speeds they seem to be more decisive than some other discs.

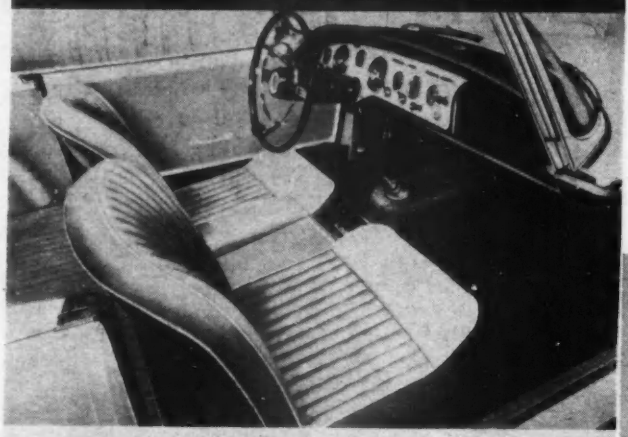
The car had still only done about 1000 miles when I took some performance checks, and it was running open, so that air drag began to affect acceleration at the higher speeds, but it knocked about a second off the time taken from 0 to 50 mph by a closed 1500 and recorded a comparable standing quarter-mile. When fully run in and with top erected it should do much better.

At present about 520 people a week are buying MG-As. They obviously have a lot of fun with them, but I must admit that for my own driving there are things I would like to change in the driving position. If the seat is adjusted comfortably in relation to the pedals, the wheel comes too close to the chest to permit a really fluent driving style. The accelerator pedal is too high to permit easy heel-and-toe action when braking and changing down, so the right foot goes hopping from brake to accelerator. My downward gearshifts tend to be jerky in urgent moments on mountain roads. I could also use a little more clearance between thigh and wheel. The starter control is a pull-out knob rather awkwardly placed behind the wheel; a key starter or press button would be easier to use.

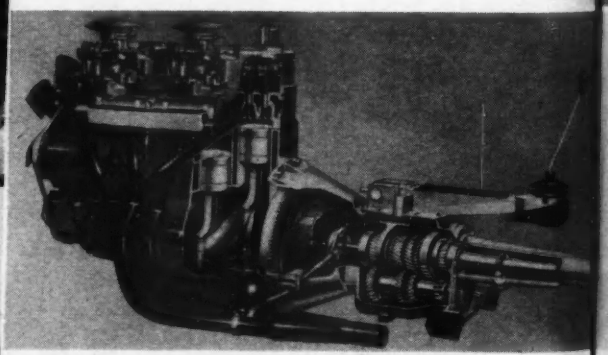
Park/turn and tail light styling is new. Open two-seater has rigid side curtains with plastic sliding windows. Option choice includes wire wheels and special competition seats.

On straight, open highways, the little car goes singing along at 5000 rpm in top, which represents a very useful cruising speed of just over 85 mph. At the other end of the scale it shows extraordinary flexibility. Put your foot hard down at 12-14 mph in top and it will pull away quite smoothly, without protesting audibly at such brutal treatment. The extra power has given extra sparkle to the performance but has not changed the sound, solid character which has made the MG-A so popular. With the new disc brakes, it lives up more to the famous slogan, "Safety Fast."

SLEEK AND SNUG



A two-seater roadster with wind-up windows, the Alpine converts into a snug coupe with an extra-cost detachable hard top. Space behind front bucket seats is limited for small packages, and trunk space is sparse. A lockable glove compartment fills gap between seats and acts as a folding armrest. The dash carries a full complement of instruments. Two Zenith down-draft carburetors and dual exhaust system, plus a higher compression ratio and a new aluminum head, increase 1494cc engine output to 83.5 hp without reducing reliability.



Rootes' new sportscar—the Sunbeam Alpine—has disc brakes, steel unit body and clean lines... all for a popular price

ROOTES ARE ENTERING the sportscar market with a popular-priced two-seater which has smooth style, unusual weather protection and disc brakes. Introduction of the new model is scheduled for the early fall; p.o.e. price (not yet announced) will probably be around $2500.

Mechanical parts are based on those of the Sunbeam Rapier, but the engine is extensively modified to raise the power output to a reliable 83.5 hp, and the car has an entirely new all-steel unit structure. Basic model is a two-seater roadster with wrap-around windshield and wind-up side windows, but a detachable hard top is available. There is a small luggage trunk and additional space for baggage or parcels behind the seats on a platform 38½ x 16 ins., which can also seat two children.

Power of the four-cylinder ohv push-rod engine (1494cc) has been raised nearly 10 per cent, chiefly by the use of a new aluminum cylinder head with inclined valves in line and a compression ratio of 9.2 to 1. There are four intake and four exhaust ports and this has permitted valves to be arranged alternately —intake/exhaust, intake/exhaust, etc.— right down the head, simplifying cooling and allowing better breathing for higher specific output. The three bearings of the crankshaft are white metal; the big ends are copper lead with indium lining. There is a new camshaft, also in three bearings. To strengthen the block for the higher power output, stiffening webs now run down inside the crankcase wall. The crankshaft itself is made of steel with higher tensile strength than that used for the Rapier coupe and convertible. Carburetors are two down-draft Zeniths and there is a four-branch exhaust system merging into twin down-pipes.

Transmission is through a single-plate Borg and Beck clutch of 8-in. diameter with hydraulic control, and four-speed gearbox with synchromesh on top three, controlled by a central lever, to a hypoid rear axle. In the gearbox, top, third and second gears are more closely grouped than on the Rapier, which is a welcome improvement, but bottom gear is lower than ever, so that the gap between first and second is much wider. However, as the axle ratio is 3.89 to 1 against 4.55 to 1 on the Rapier coupe, the overall first gear is still higher.

Front suspension is the same as on the coupe—wishbones, coil springs, anti-roll bar and telescopic shocks. Rear suspension is conventional, with rigid axle, semi-elliptic springs, and piston-type, double-acting shocks. Girling disc brakes of 9½-in. diameter are used at front, with pads giving 20.6 sq. ins. of friction area. Drum brakes are used at the rear with nine-inch drums and 60 sq. ins. of lining area. Wheels are perforated bolt-on discs, but center-lock wire wheels with triple-eared knock-offs are an optional extra.

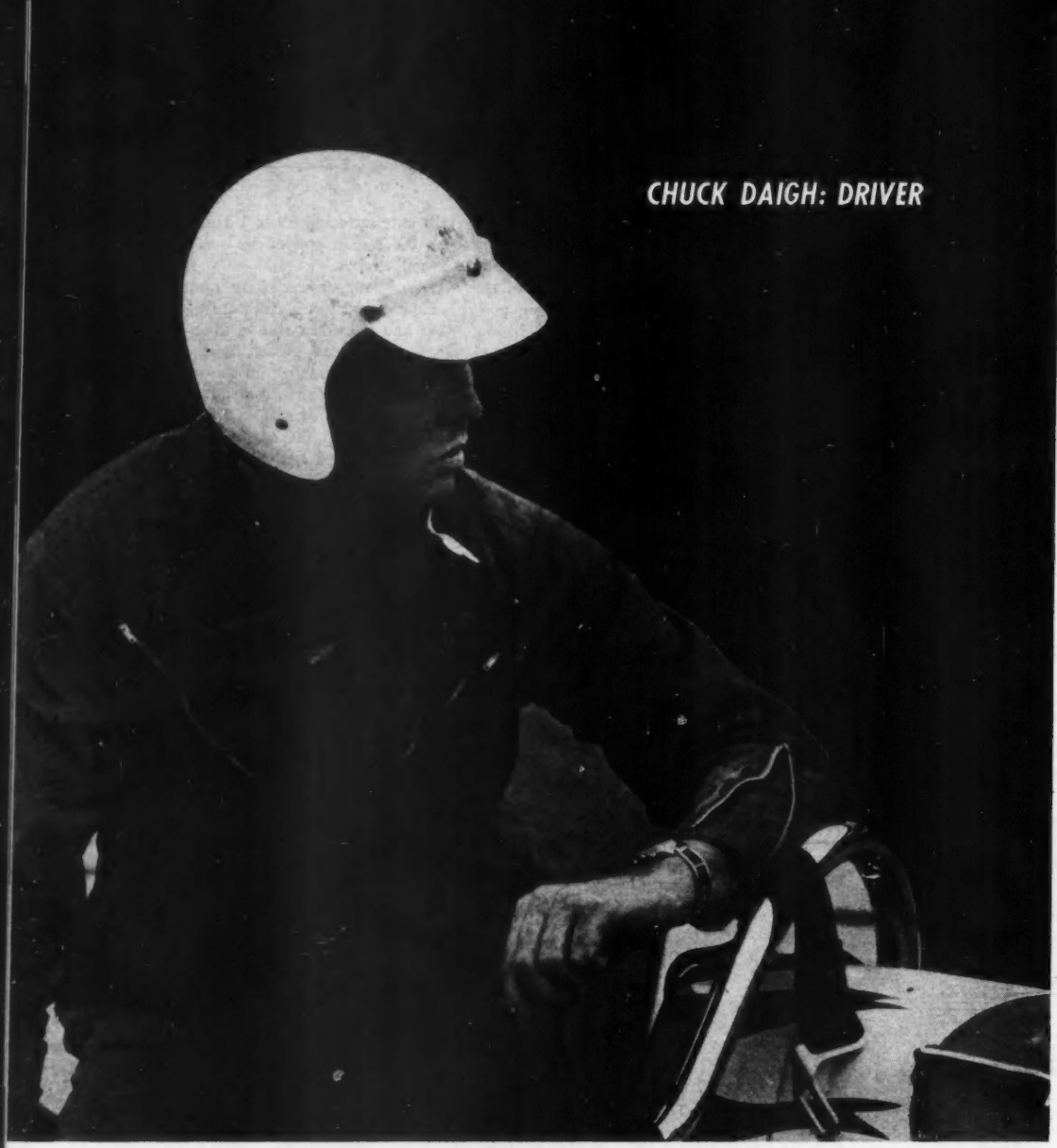
Interesting feature of the interior is a central armrest forming a locker for gloves, sun glasses or camera; it has a lockable lid. Instruments include speedometer, tachometer, oil pressure gauge, fuel gauge, thermometer, ammeter.

The Alpine's combination of sensible design features and styling motif (resembling the popular two-seater T-Bird) should help make it a bright ray in the Sunbeam line.

by Gordon Wilkins European Editor

Cutaway of Alpine shows wishbone and coil spring front suspension with Girling disc brakes and ball joint steering. Rear brakes are drum type.

See page 73 for driving impressions



CHUCK DAIGH: DRIVER

SPORTSCAR DRIVING ACE CHUCK DAIGH relaxed against the wire fence surrounding the garage area at Indianapolis Motor Speedway and prepared to answer a question put to him at least a thousand times since he passed his driver's test for the annual 500-mile classic.

"How does driving here," we had asked, "compare to sports-car racing and the powerful machinery you have been driving on road racing circuits?"

Chuck was completely relaxed, not because mechanical troubles had kept the Agajanian mount he was slated to drive from making the 500 lineup, but because he is a naturally relaxed guy. In a way, this is an incongruous situation, for if ever there was a young man in a hurry, Daigh is it. This ability to relax is one of the important things—coupled with his skill—that enabled him to pass his driver's test with high praise from the racing committee for his smooth driving.

Chuck doesn't talk much—a wonderful asset, but a hindrance when you attempt to pry information from this freckled young man, who is full of real good information. What he has to say will certainly rock a large segment of the amateur professionals or professional amateurs (take your choice), and wealthy or pseudo-wealthy "sportsmen" who look down their noses at any race driver who "does nothing but turn left."

"The Indy driver," Chuck asserts, "*is without a doubt the most skilled in the world today.* Speed on any course requires the maximum through turns and this is what they get. So left-turn-only, right-turn-only, this is the way the real pros make their living. Sportscar driving? Anyone can learn to shift gears."

This is no idle statement, for Chuck has experience in both types of driving. He's done quite well in the Scarabs of Lance "Cost Is No Object" Reventlow, and hopes to continue this success in the European conquest with the new Formula I Scarabs in 1960. Passing his driver's test the first year at Indy is a notable accomplishment in itself. With no discredit to this feat, though, Chuck *should* know his way around the 2½-mile oval; he's been there before.

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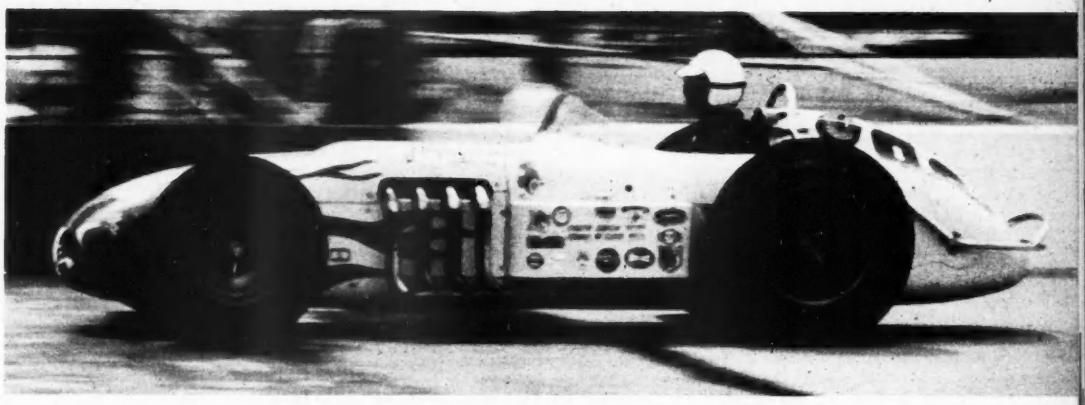

Daigh at speed on the main straight at Indy. His smooth driving won praise from observers and a nomination for Rookie Driver of the Year despite failure to participate in the actual race.

...young man in a HURRY!

Story by Charles Nerpel, Photos by Bob D'Olivo

Fantastic racing record of Scarabs was due largely to Daigh's driving skill but his development and research were a big factor in their success. He is shown winning the 1958 Grand Prix at Riverside, Calif., in the Chevy-powered Reventlow Scarab.

...young man in a HURRY!

Chassis adjustment problems kept Daigh from qualifying the Agajanian entry and he became member of Jim Rathmann's pit crew rather than try for a relief driving job.

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In 1956, when Ford took the Stevens Trophy for stock car speed and endurance records away from Chrysler, the driving team consisted of: Johnny Mantz, Danny Eames, Chuck Stevenson and Daigh. Chuck spent about 10 hours behind the wheel of that Ford, maintaining almost the same 115 mph through the corners that they were able to clock in the straights. But as Chuck says, "There is a lot of difference between 115 and 140 mph. There is a fast groove and if the car handles well enough to stay in it, you have enough speed to qualify and possibly win. If you can't stay in this groove, you can't go fast enough to do either. There is little chance of recovering from a mistake on the Indy course — the skill lies in being able to go fast without error. Sportscar racing allows considerable recovery time, but at Indy luck plays an important part in recovery from serious errors in driving. Failure can and often does prove fatal."

Wind, of the type that had made the last day of qualifying hazardous, began to whip the spray of gunk and water that nearby car owners were using to sluice down their mounts after the last four hours of practice before the races. So, we moved from our comfortable position along the gasoline alley fence and wandered along the rows of garages, beehives of activity that constantly diverted our attention. Every variety of motorized scooter was weaving through the maze of partially dismantled race cars and portable fuel tanks. Stacks of racing Firestones awaited their turn on the Bear balancing stands. A representative of Bell Helmets was gingerly threading his way through this activity, carefully guarding the fresh and fancy paint jobs on four 500 helmets.

Interspersed between garages housing mechanics slaving over the cars that had made the lineup were the repair and supply garages for important components of these racing machines: Joe Hunt, busy checking magnetos (28 out of the 33 cars used Hunt mags); A. J. Swanson, the shock absorber expert, holding forth with a refrigerator of imported salami and other snack delicacies for the racing fraternity in the

Always a quiet, absorbing listener, Daigh is an expert at putting expert advice to practice. Skilled in the Scarab sportscars, he quickly "unlearned" many things in the Indy machine.

Monroe garage; Slim Wykoff fitting a McHal helmet to veteran Duane Carter, who fidgeted in the cockpit while mechanics altered the seat and pedal position.

As we walked along, someone leaned out of each of the garages for a word with Daigh, making the rest of the interview difficult — to say the least. We finally steered out of the fenced garage area and into the quiet confines of the USAC offices under the Tower Terrace grandstands and got back to the subject of our interview.

"Seems to us," we said, "that a sportscar driver has to do some unlearning here at Indy. Is that true?"

"Sure is," replied Chuck. He had driven hundreds of practice laps (equal to nearly two complete races) before taking his driving test. He found that the most difficult thing for a sportscar driver to overcome is the natural tendency to use brakes in the corners. He tried various positions for his feet to make the throttle foot stay on the throttle, not lift it on the corners and ride the brake pedal. Tony Bettenhausen uses brakes on *every* corner, driving into the turn fast and deep, then slowing with a jab at the pedal and accelerating out. This technique amazes most other drivers and Chuck's answer was that Tony knows how to lap at high speed without brakes if he has to. He probably figures to grab an early lead until the brakes begin to go, then finish the race in the high-speed groove with just enough stopping left for the necessary ones in the pits.

Driver comfort, or lack of it, compared to sportscars, plus the noise and vibration, are other things Chuck had to become accustomed to. "The vibration is not too bad after the engine hits over 6000 revs, but too little attention is paid to pedal position and seat contour."

Lujie Lesovsky brought in a special "body engineer," Dr. Lynd Esche, to design the seat for Johnny Thomson. This is the medical-mechanical expert who built the seat for Colonel Stapp's high-speed sled ride. Lance Reventlow hired him to design the seats for the new Scarabs. They have very little padding but they support the body well and are comfortable on the long hauls.

What was it like the first time out on the course? On the first few laps, with the noise, heat, vibration and concentration on the course, Chuck had the feeling he was flying, but the pitboard flashed to him showed he was lapping at only 95 mph. Constant practice, with stops between series of laps to listen to advice of top Indy drivers about cut-off points, what groove to take, and above all, to be smooth in every action, finally brought Chuck's speeds up to where they were consistent enough to begin the driving test. He paid great compliment to the willing help from the "old pros" at the Speedway, especially Rodger Ward.

As Chuck worked his way up through the various speeds of the test laps under constant surveillance by the driver's committee, he began to notice a change in chassis handling at 130 mph. Rather than run the risk of failing the test because of rough driving, he pulled in for a check that revealed loose rear suspension arms. The observers were very complimentary for Chuck's actions in detecting the possibility of some mechanical malfunction and pulling in. These are the critical high-speed laps, and once the loose components were tightened and adjusted, he completed the test and had earned the "USAC Registered Indianapolis Driver" license. (Only 47 drivers hold this license.)

The next problem, of course, was getting the car into the race. Things begin to happen to chassis and engines in the 140-mph range that never show up at 130 mph. Lap after lap, with much head shaking by owner Agajanian and much adjusting by mechanic Frank McGurk . . . no luck. Other drivers tried to qualify the car on the slim chance that Daigh, veteran sportscar driver that he is, was just not getting the most out of his first attempt with Speedway machinery. Again there was the head shaking, the adjusting, and both qualifying weekends slipped by without the car or Chuck making the lineup. Asked about the possibility of relief driving, Chuck stated that he did not feel that he had enough experience to hop into a strange car and do justice to it.

Just before Chuck took off for his Memorial Day activity — pit-crewing for Jim Rathmann — we asked, "What kind of machinery and what success do you think American builders and drivers would have if they ever concentrated on international Grand Prix racing as they do on the annual Indianapolis race?"

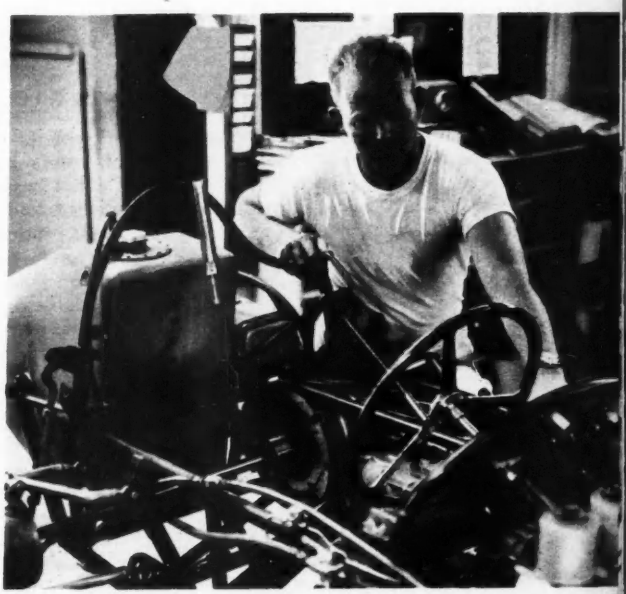
Chuck thought for a moment before he answered.

"We're doing a bit of concentration on that score at Reventlow Automobiles, as you know. The engineering know-how is certainly available in this country — not in factories — but in many small garages where most of these Indy cars are built. European machinery is fast and years of experimenting on established courses has made chassis and engines adaptable to this type of racing, just as similar experience has evolved the present Indy combination.

"One thing that impressed Europeans when they saw the Monza contests was the immaculate preparation and beautiful finish of the American cars. They're spotless, smooth, well-painted, plated and clean, even down to the remote corners of every weld in the frame. This has always been a fetish with Indy car builders and you can see it in every garage in gasoline alley. Some of the garages are as clean as operating rooms in a hospital.

"We practice this with the Scarabs and intend to carry it on with the new Formula I cars. A well-finished car encourages the continuance of keeping it clean and makes inspection of all components easier and more thorough. It's hard to find a crack indicating structural failure under a layer of grease or dirt.

"Some of the European circuits are rough, rougher than the old red brick pavement on the Speedway straight, but from what little experience those who participated at Monza have already gained it wouldn't take too many races before American builders could make the Europeans take notice of our cars and drivers." /MT



In addition to duties as team and chief test driver for Reventlow Automobiles, Daigh earns his living as the man in charge of Scarab research and development. Current project: the new Formula I chassis and engines.

HOW THE FORD *Falcon* WAS STYLED

Astrion reached the full-scale clay-model stage, was rejected because rear seat lacked headroom. Front end kept Ford family styling. The Falcon will have sculpturing slightly curved, making car appear longer.

by Bill Callahan Detroit Editor

THE DECISION TO BUILD a new car at Ford starts with the findings of the Market Research Department, composed of top-flight personnel (and not to be confused with Consumer Research, which has to do with the customer's likes and dislikes as applied to specific cars). This committee's continuing studies of marketing factors such as population growth, population shifts, probable changes in living, travel and shopping habits, competition from other sources for spendable dollars and many other imponderables, bring a conviction that perhaps three to four years down the road a new type of car will be needed to meet the customer's wants.

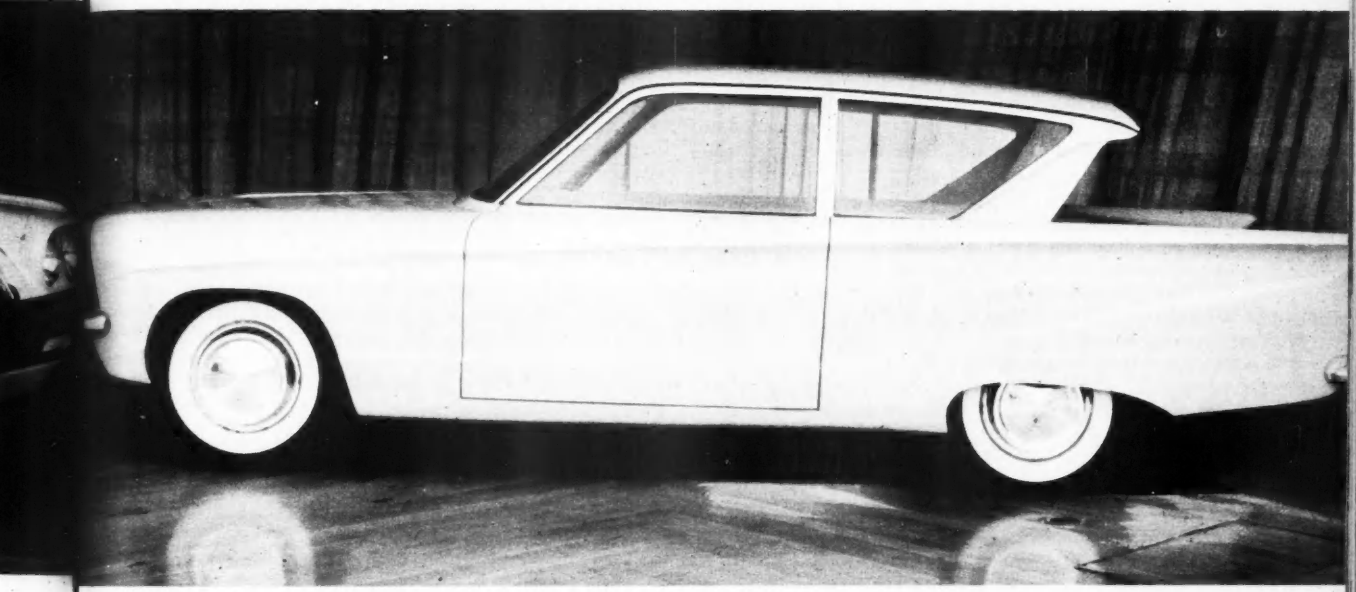
Such was the decision made to start development of a new small car. While the Falcon followed much the normal pattern of development of year-to-year models, certain stringent security measures were necessary. The project from the beginning was taken out of the regular Styling Section and housed in a special room. Only a limited number of persons were permitted access to this room and individual keys were issued to those entitled to entry. In this way any leaks could be checked back to those who had access. Mechanical components were tested in models using Ford Taunus bodies and some were hidden in British Ford models. Every effort was made to avoid leaks by limiting personnel on the project to a carefully screened few.

Even with such security measures rumors leaked out. The project name was changed from time to time, starting under the designation of XK Thunderbird, later changed to Lavion, then Astrion and finally Falcon. At least nine additional names were considered but are not revealed, as patents on them are still open. The original project designation probably accounted for the early rumors that Ford would offer a smaller, $1000 T-Bird.

Once Market Research findings indicated the need for a new-type car, it passed its findings along to Product Planners, who attempt to develop a concept of what type of car the great mass of buyers are likely to want when such a car conceivably can be produced. This concept became the basic guide in designing a final product. It covers such factors as overall length, width, height, wheelbase, horsepower and price range. Product Planners also is a top management group which then met with Engineering Research, Body Engineering and Styling Section head men and outlined the concept to them.

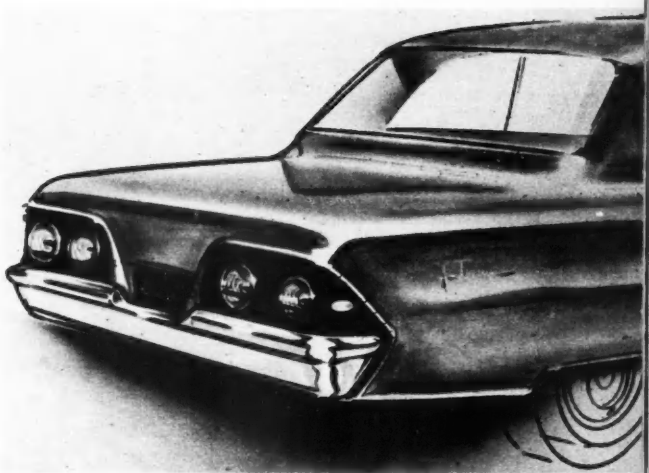
In the early stages an effort was made to keep styling in line with the Ford family designs, but later this idea was discarded in favor of a completely new design with softer, more flowing lines. This is evident in many of the sketches seen here. Some have a distinct Thunderbird flavor, while

The birth of a new car is a long and tedious task of creating, eliminating, adding and changing. The incubation period for Ford's new Falcon started early in 1957 when combined sales of small U.S. cars and imports accounted for only about five per cent of the total market. Endless sketches, renderings, 3/8-scale clay models – and no fewer than 20 full-scale clay models – of the Falcon itself were developed, not to mention dozens of earlier project models which also reached the full-size clay stage before being discarded.



Designed around a minimum of chrome, the radical appearing Lavion II gave way to less extreme Astrion model, which in turn ultimately gave way to Falcon. Falcon's silhouette is quite low, quite conventional.

One idea at Lavion stage was an identifiable grillework at the rear. When Lavion was discarded, so was this idea. With it, went fins and exhaust ports. Finalized Falcon design has one large bulls-eye tail lamp in each sculptured recess.



The beginnings of Astrion started as a sketch, progressed to full-size model stage. Since the circular tail lights have been a Ford feature, they were incorporated. Design is à la T-Bird; when Astrion went, so did this styling treatment.

HOW THE FORD *Falcon* WAS STYLED

Early in the Ford Falcon styling program both the Edsel and the Thunderbird exerted a strong influence in renderings the stylists made.

continued

later ones gave way to the smoother lines of the Astrion.

The next step was the development of a chassis layout: type and location of powerplant, type of suspension, transmission and driveline and type of frame. This layout was then passed on to the body engineers and stylists as their key in developing a package that would appeal.

At no point in the developmental area were designs definitely frozen. It became a continuing process of give-and-take among the various groups to coordinate ideas and components into an integrated whole that would meet the overall concept as outlined originally by the Market Research Section.

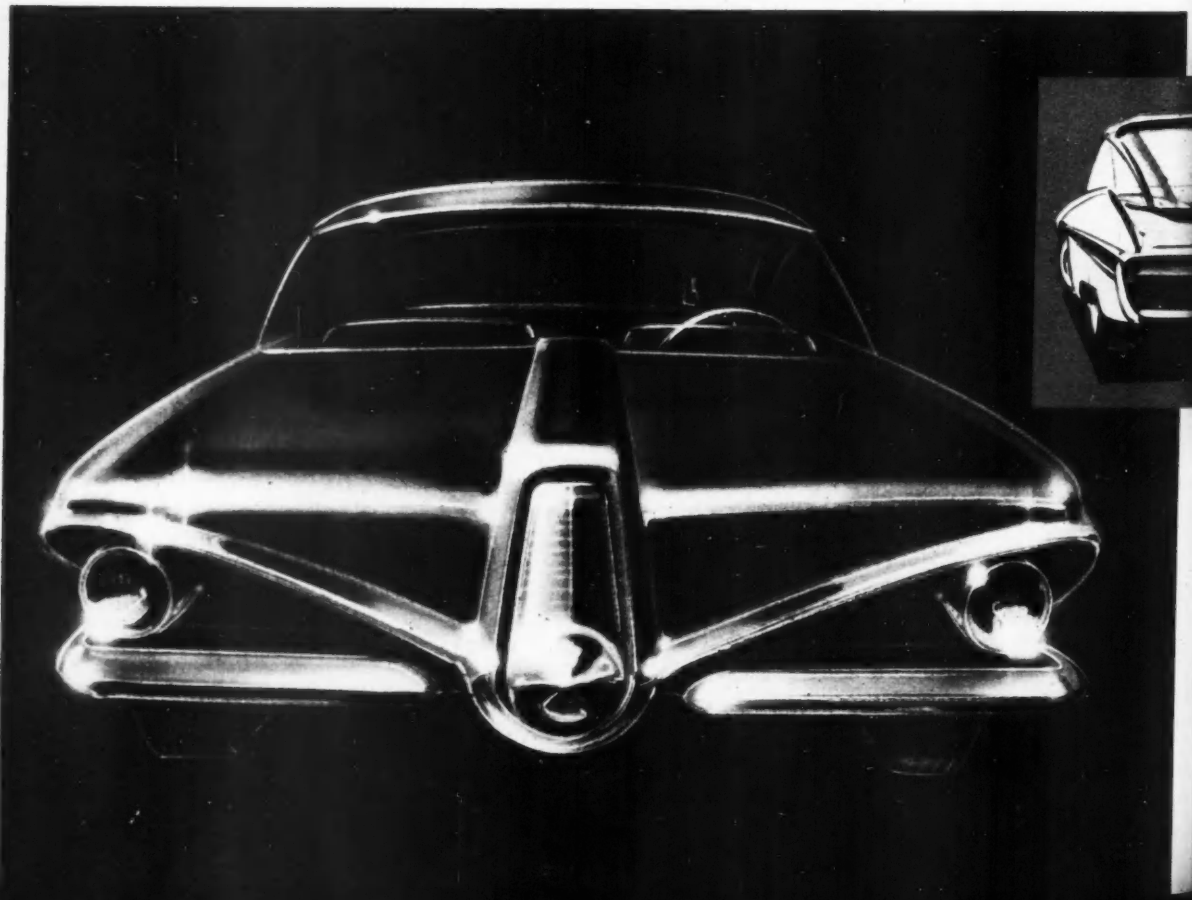
Endless sketches of proposed final designs were developed and additional countless sketches of details, interior layout, location of controls, instrumentation, etc., were submitted. When a sketch was tentatively approved, it was developed into a rendering. At each step suggested designs were discussed, modified or given partial approval. When a rendering was approved the next step might be the development of a ⅜th-scale model, which enabled the groups to study the proposal in three-dimensional perspective. In the case of the Falcon a great number of these diminutive models were presented. No *one* model was picked as *the* one; the final choice represents a combination of features of a *number* of models.

From the ⅜th-scale model, a full-size clay model was built. No fewer than 20 full-size clay "Falcons" were developed, the Lavion on the cover being one of them. Each, in turn, was modified in one way or another before final approval.

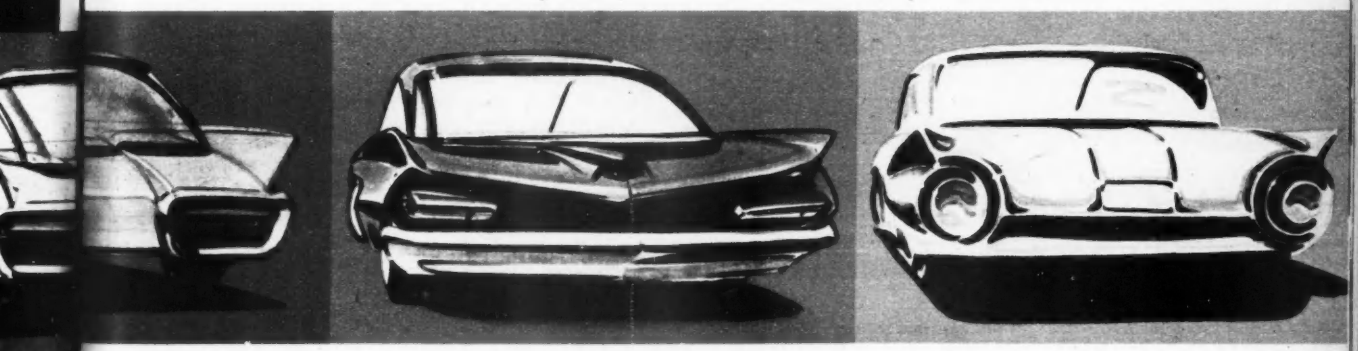
After the final approval of the clay model, it was then reconstructed in plaster, which generally represents its final form; however, even after this decision has been reached side panel ornamentation can be changed or new grilles or other minor changes can be effected. That is why no "conjectural" sketch of an upcoming car can be completely accurate.

With designs and layouts of components well frozen, the long, long task of tooling production lines, arranging for parts and materials, preparation of introductory programs, final cost analysis to determine prices and many other factors had to be correlated. Pilot models were built and tested and suppliers' products were carefully checked from a quality control standpoint.

For obvious reasons Ford will not reveal actual cost in-



Cyclops headlights set between two-piece bumper was a new approach. If accepted, such ideas are worked out in detail; this one was rejected in favor of conventional placement.

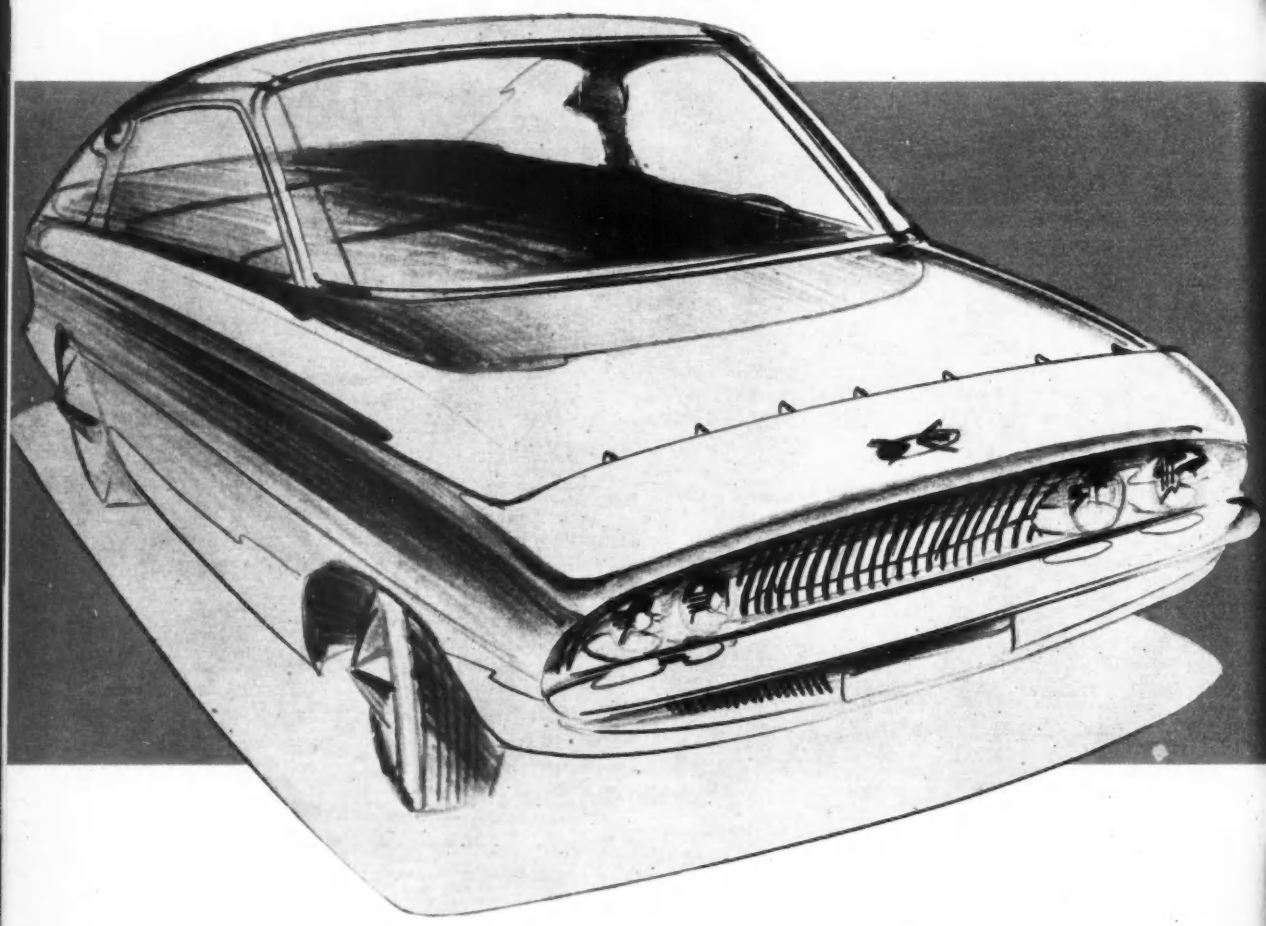


Project XK Thunderbird, started in late '56, had far too many details too close to the Bird itself. Modified design (center) combined some features of the bird with those from Edsel, but this idea never got past the rendering stage. But still, in later stages, T-Bird theme kept cropping up. It was finally decided that similarity would detract from the Bird, and name was changed to Falcon.

Considering that these sketches were made in '57, front end treatment for Edsel was among suggestions. The idea was to direct interest toward the center section of grille. Final decision was to make the Falcon's grille horizontal.

HOW THE FORD *Falcon* WAS STYLED

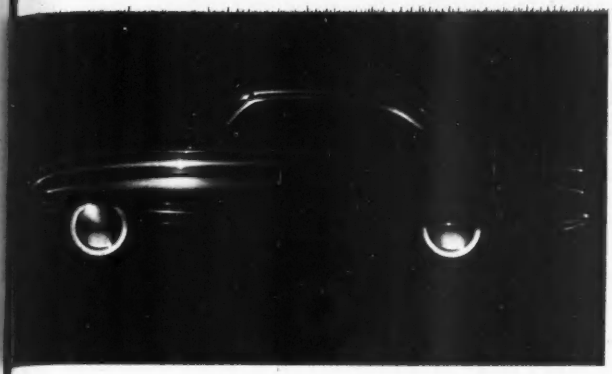
It was natural that European influence would be felt in some of the proposed Falcon designs, as well as totally new concepts – unlike any seen today.



continued

volved in the development of its new Falcon line. Since the work has been in progress since late 1956 or early 1957 and the project included entirely new tooling to provide unitized bodies, it may be assumed that costs were higher than those involved in the development of Edsel, which was able to use many components from other lines. The cost of the Edsel program was estimated at approximately $150 million. The fact that the Falcon is considerably smaller than the Edsel has little or no influence on tooling and machine costs. Actually, this part of the Falcon program could have been more costly, since new equipment aimed at holding production costs to the absolute minimum undoubtedly ran quite high.

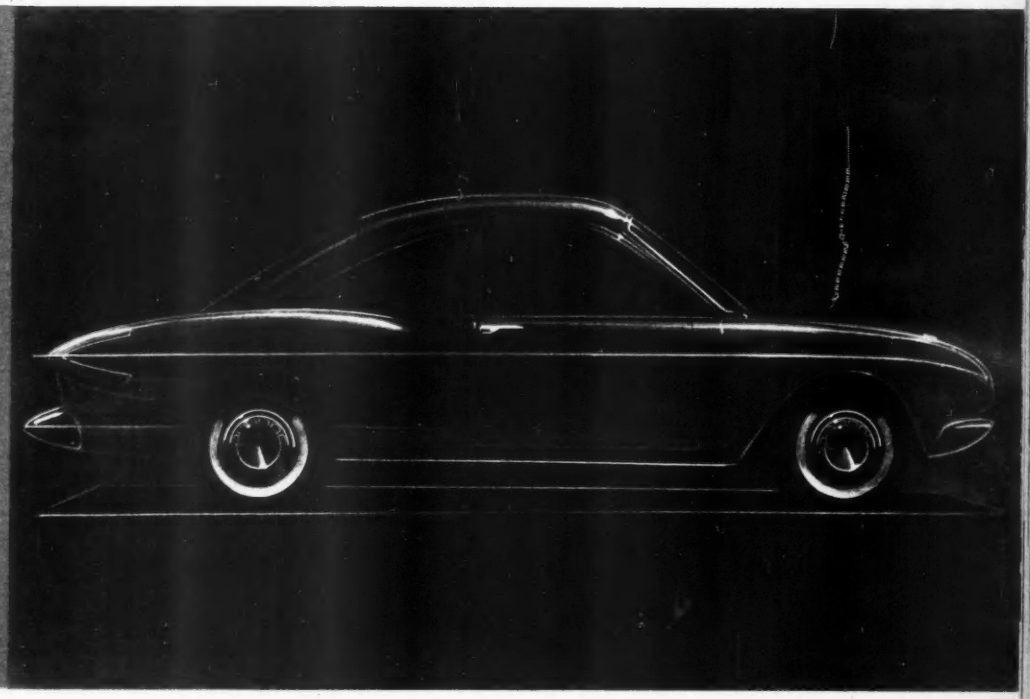
It is understood also that new facilities will be capable of turning out at least 650,000 Falcons a year if the demand warrants. Everybody at Ford, and for that matter throughout the industry, is waiting to see what public reaction will be to the smaller models. It is generally felt that the overall market for these units will have to be between a million and a half and two million annually to pay off. On the other hand there is good reason to feel that the overall market will expand with the wider choice of cars thus made available. Certainly it will be more interesting to all of us. /MT



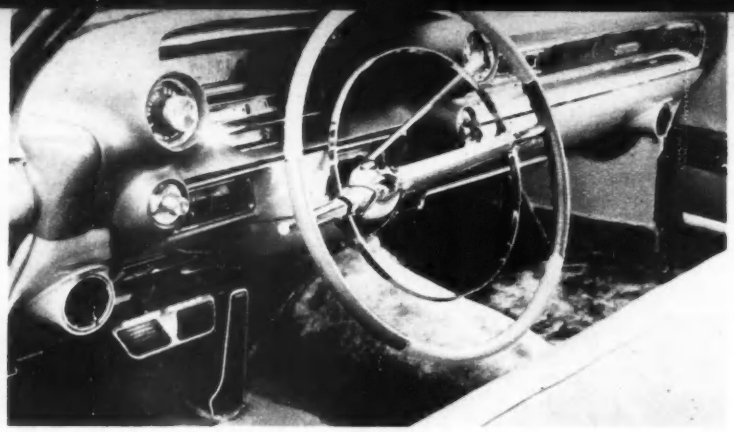
This design would have made a very smooth Falcon, but it was rejected because of its questionable salability.

thought was given
-back roof and lots
European flavor (l.),
the concave grille
ded horizontally by
-piece bumper, dual
lights above bumper.

r, changes by drop-
off front end, kick-
in projectile-shaped
quarter (r.), kept
European flavor with
variation on the fast-
k roof line for fit.

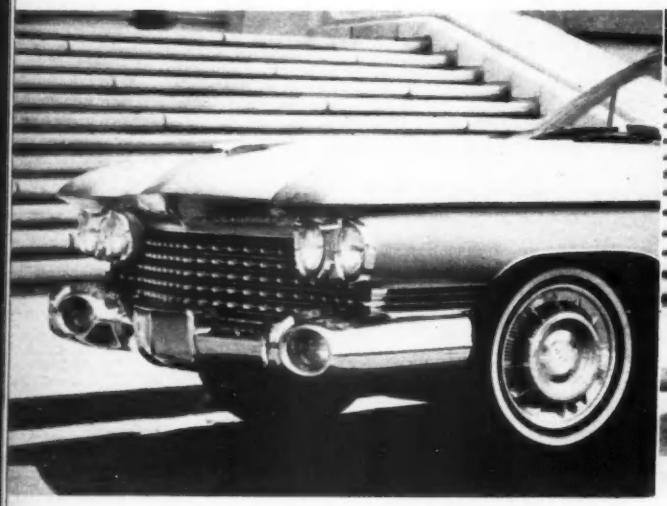


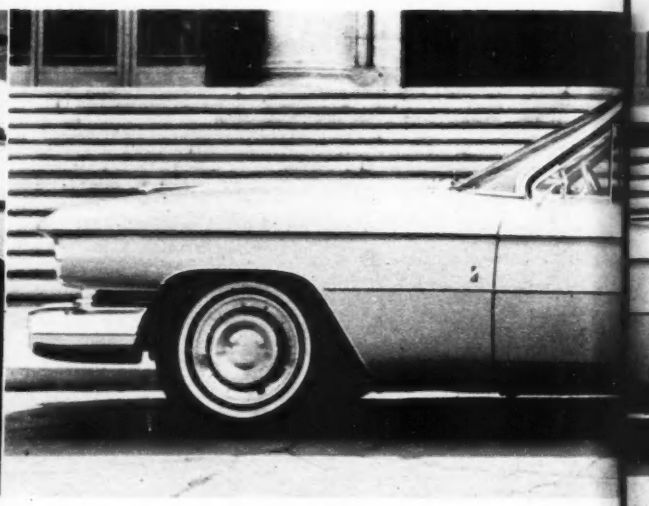
Nice, but rejected, was this early Lavion theme. Effort was made at greater headroom while retaining balanced design. This was discarded; Falcon is finless.



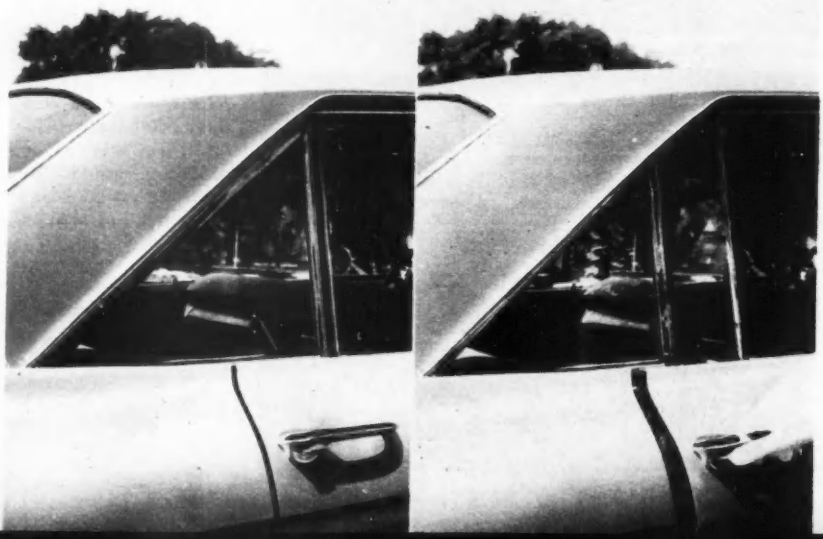
"Quiet elegance" is the way Cadillac describes the instrument panel of the Eldorado Brougham. Instruments are well clustered, recessed, raised closer to eye level. All equipment is powered and is standard, including windows, ventipanes, steering, brakes, seats and door locks. Other standard features include "cruise control" and air conditioning.

ELEGANT





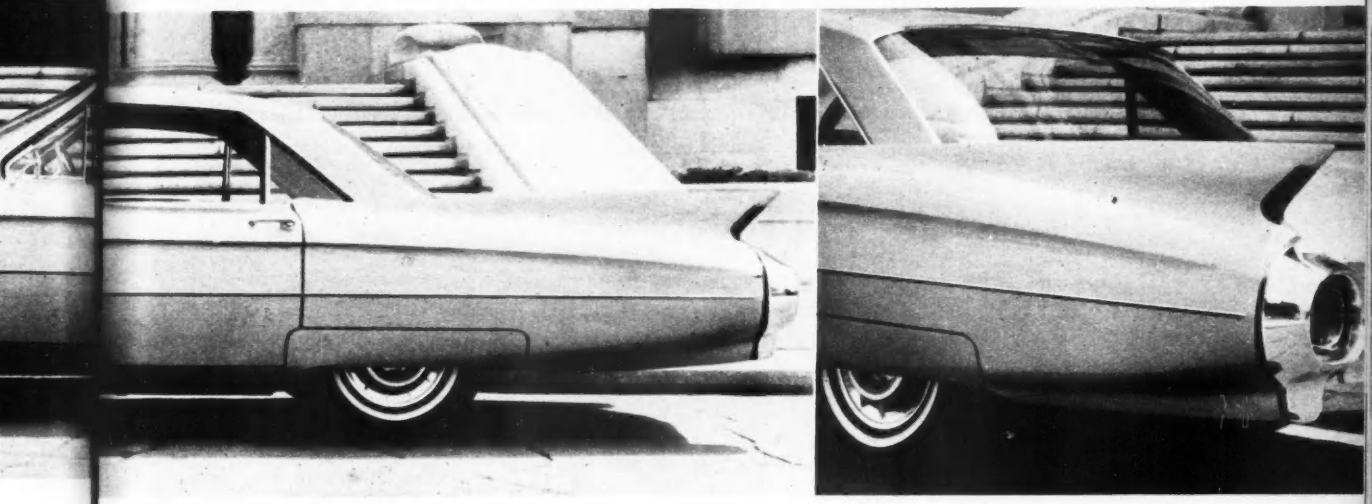
Custom-designed and custom-built, Cadillac's Eldorado Brougham continues as a limited production car—for the "not-so-limited" few.



A new (and necessary) innovation is in the rear quarter panel window. As the rear door is opened, the window slides into a recess for easier passenger entry. As the door is closed, it returns to its original position. The window can also be operated in the normal manner from the inside.

Interior appointments of the Brougham shout quality, from the mouton carpeting, to the broadcloth upholstery, to the courtesy lights, to the way that the car is finished. Extra storage for small, valuable items is possible in two lockable compartments in the package shelf behind the rear seat. (It's a safety feature, too.)

ELDORADO

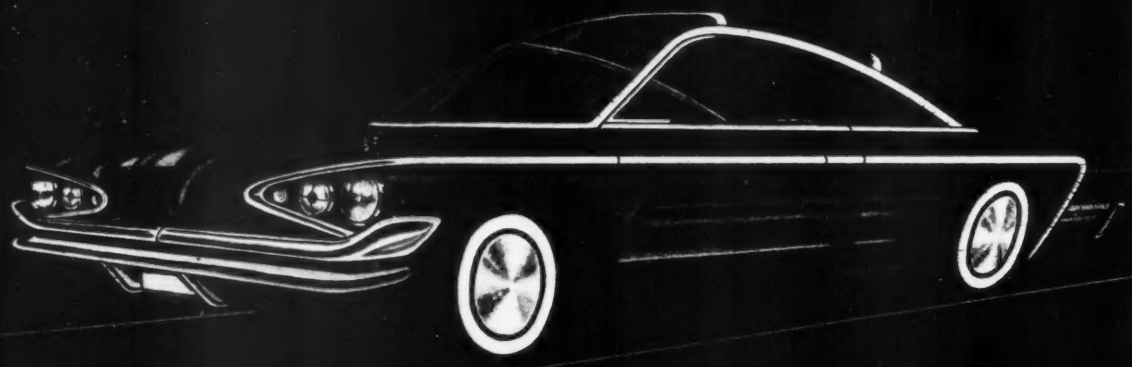


IN STYLING, CRAFTSMANSHIP, interior luxury and attention to every detail, the Brougham has no peer. It is the true monarch in Cadillac's realm of motoring majesty for 1959." So said James M. Roche, general manager of Cadillac, when this GM division introduced the car at the Chicago International Auto Show in January of this year.

Until recently, we had to take him at his word, for these $13,075 luxury cars were as scarce as the proverbial hen's teeth. Now, however, we have been able to look over a virtual bevy of them that were being prepared for customers in the special shop set aside for this purpose in Detroit. And we'll have to admit: styling, craftsmanship and interior luxury are all far better than on most any car we've seen.

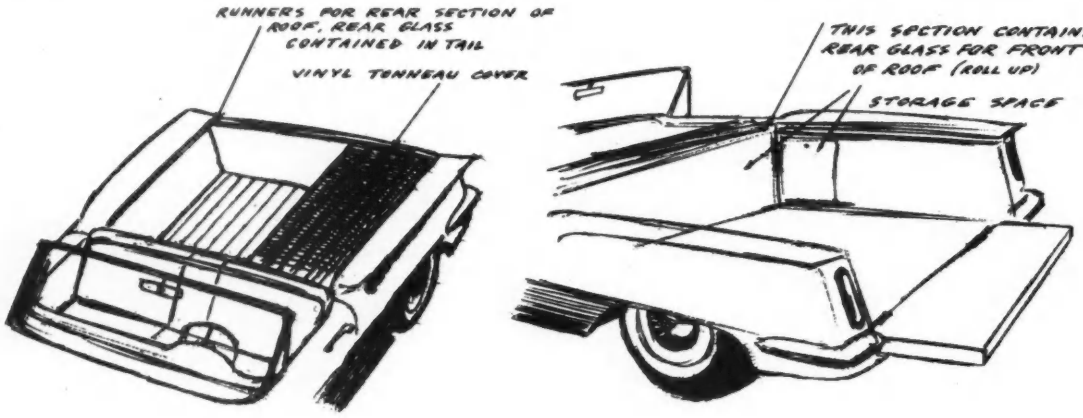
The cars get their beginning at Cadillac, where the parts are built, pre-assembled, crated and shipped off to Italy. There, Pinin Farina drops on the body he has built for it, installs the interior, finishes it off and sends it back to Detroit. Final touch-up, including finish painting, polishing and tune, is given to the cars and then they're whisked away to dealers for delivery to lucky customers.

The entire trunk of the Eldorado Brougham is covered with a nylon frieze material, including the decklid, the spare tire (laid horizontally) and the fold-down cover over the battery. Though the trunk is not as great in cubic space as some cars, it still holds ample luggage.

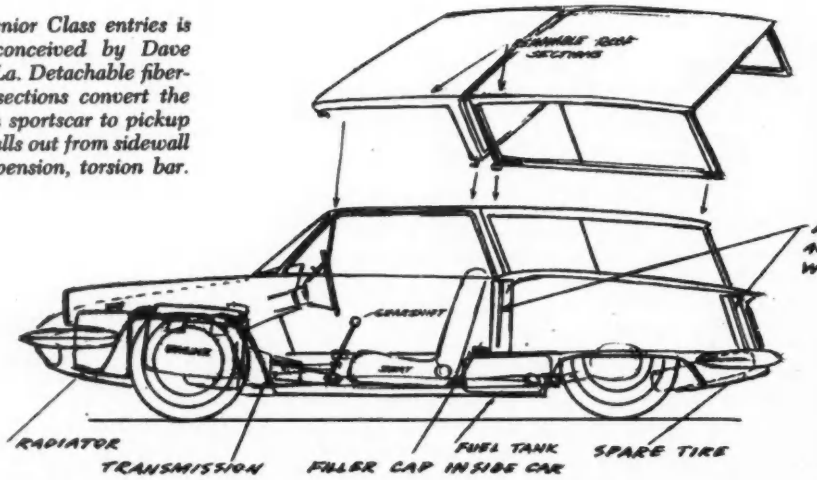


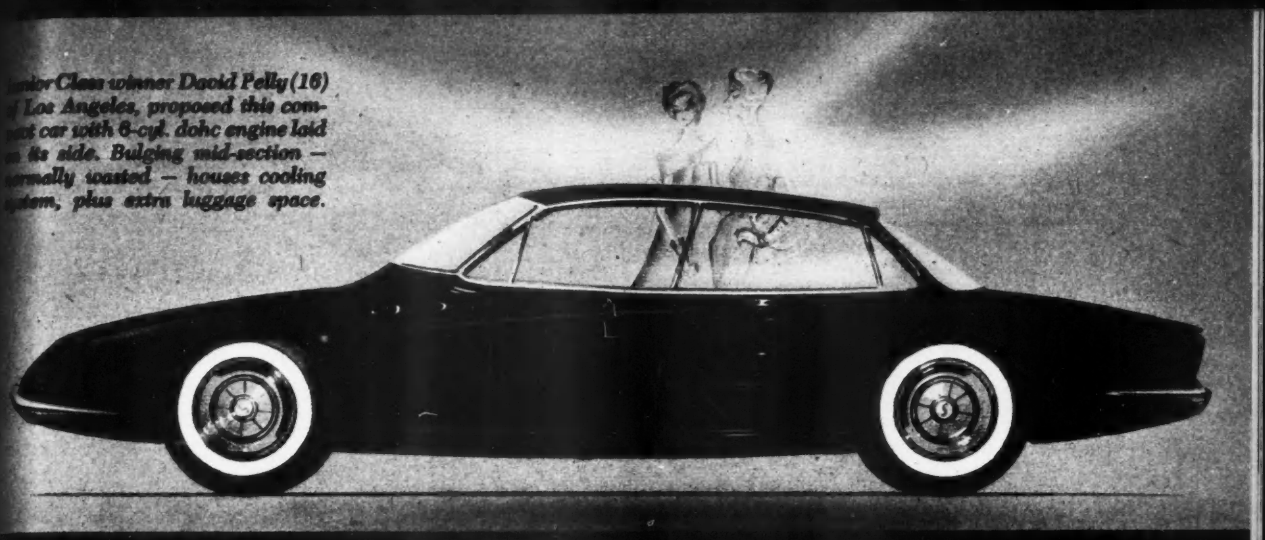
Tourist coupe designed by Donald Kidwell of St. Louis, Mo., would have rear-mounted blown V-8 engine and 3-speed transmission, four-wheel coil pendent suspension, size comparable to Jaguar.

Custom Car Contest


RUNNERS FOR REAR SECTION OF ROOF, REAR GLASS CONTAINED IN TAIL
VINYL TONNEAU COVER
THIS SECTION CONTAINS REAR GLASS FOR FRONT PORTION OF ROOF (ROLL UP)
STORAGE SPACE

Winner in this month's Senior Class entries is the Talon Sportwagon, conceived by Dave James (19) of Shreveport, La. Detachable fiberglass cab and back roof sections convert the 100-in.-wheelbase car from sportscar to pickup to wagon. Vinyl tonneau pulls out from sidewall recess. Engine, 4-cyl.; suspension, torsion bar.



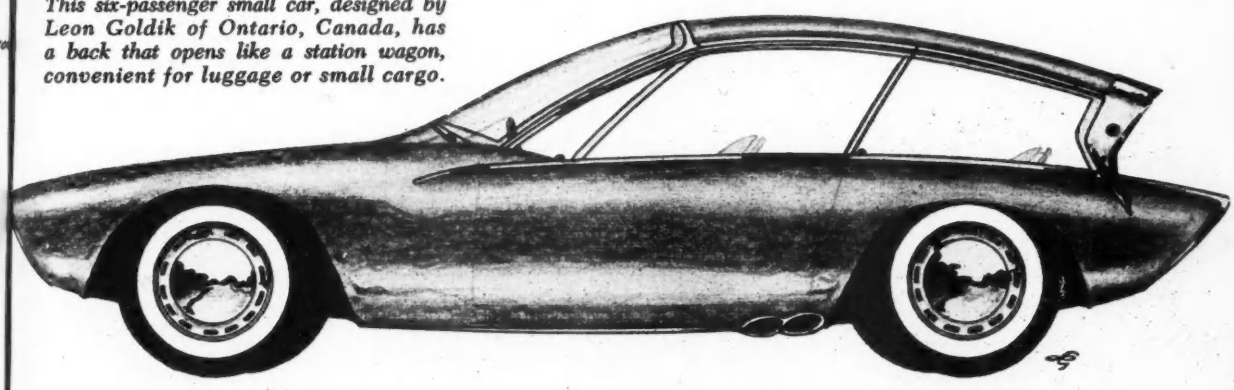


Junior Class winner David Pelly (16) of Los Angeles, proposed this compact car with 6-cyl. dohc engine laid on its side. Bulging mid-section — normally wasted — houses cooling system, plus extra luggage space.

Project IDEAS

INDIVIDUAL DREAMERS ENCOURAGE ADVANCE STYLING

This six-passenger small car, designed by Leon Goldik of Ontario, Canada, has a back that opens like a station wagon, convenient for luggage or small cargo.



You may enter the monthly Project IDEAS contest by submitting 1. an original automotive design sketch or detail drawing — for a complete car or for one or more components, 2. an original model car or a model built from any Revell car other make customizing kit, or 3. photographs of an actual full-sized car that you have designed or customized. The various entry classes, monthly and grand prizes, and address for information and entry blanks are listed below. How's your entered?

PRIZES AWARDED EVERY MONTH

SENIOR DESIGNER CLASS — $100 Savings Bond
(Open to all entrants)

JUNIOR DESIGNER CLASS — $50 Savings Bond
(Entrants aged 19 or under)

APPRENTICE DESIGNER CLASS — $25 Savings Bond
(Entrants aged 13 or under)

GRAND PRIZES (awarded at year's end)

FIRST PLACE: A 16 x 32-foot $3500 Esther Williams swimming pool. Installation included.

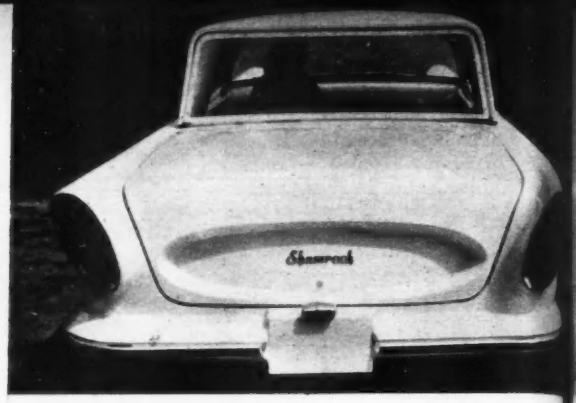
SECOND PLACE: An all-expense-paid trip for two to Washington, D.C.

THIRD PLACE: Brake linings for your car for the rest of your life.

Prizes are awarded jointly by Revell, Inc. and Motor Trend

For Contest Entry Blank, Rules, or more information, write: **PROJECT IDEAS**, P.O. BOX 272, VENICE, CALIFORNIA

Wide rear window of the Shamrock provides good vision out the rear, though the detachable hard top causes a blind spot to the right rear. Sunken-in area of rear deck is for looks and strength. Trunk compartment is of generous proportions, as can be seen in the photo below of the Irish lass. More usable loading space is provided by placing the spare tire on a separate shelf.



Instrument panel of the Shamrock is simple, with the only instruments being the speedometer, fuel gauge, thermometer and warning lights – all grouped in one dial. There is no glove box. Steering wheel position feels good, clutch and brake pedals are well spaced and floor-mounted gearshift falls to hand. The individual bucket seats are well shaped and extremely comfortable.

With the top off, the Shamrock looks much longer than its 98-in. wheelbase would indicate. Front tread is 51 ins., rear is 49 ins. Though the car bears strong resemblance to the Thunderbird, entire car was designed by the builder.

the IRISH T-BIRD

Prototype of new four-passenger sportscar, to be produced in Tralee, County Kerry for the American market, bears a strong resemblance to the Ford Thunderbird, but is to sell for half the price.

BEARING THE FITTING NAME of Shamrock, the prototype of a new four-passenger sportscar was recently introduced to the American public by a 27-year-old Californian of Irish descent. Starting into production in the early fall, the fiberglass-bodied car will be available at a proposed price of $2495.

About two years ago, William Curtis, present managing director of Shamrock Motors, Ltd. was visiting his wife's family in Ireland. That's where he got the idea "... to help the country and its people." Looking for a favorable prospect to manufacture, he thought cars the most promising.

After 16 months of intensive work, the prototype seen here was completed. He then set up a 40,000-sq.-ft. plant to produce it. Within six months he hopes to be employing 2400 workers. Plans are to ship 3000 cars to the U. S. next year, with the bulk of them going to Southern California.

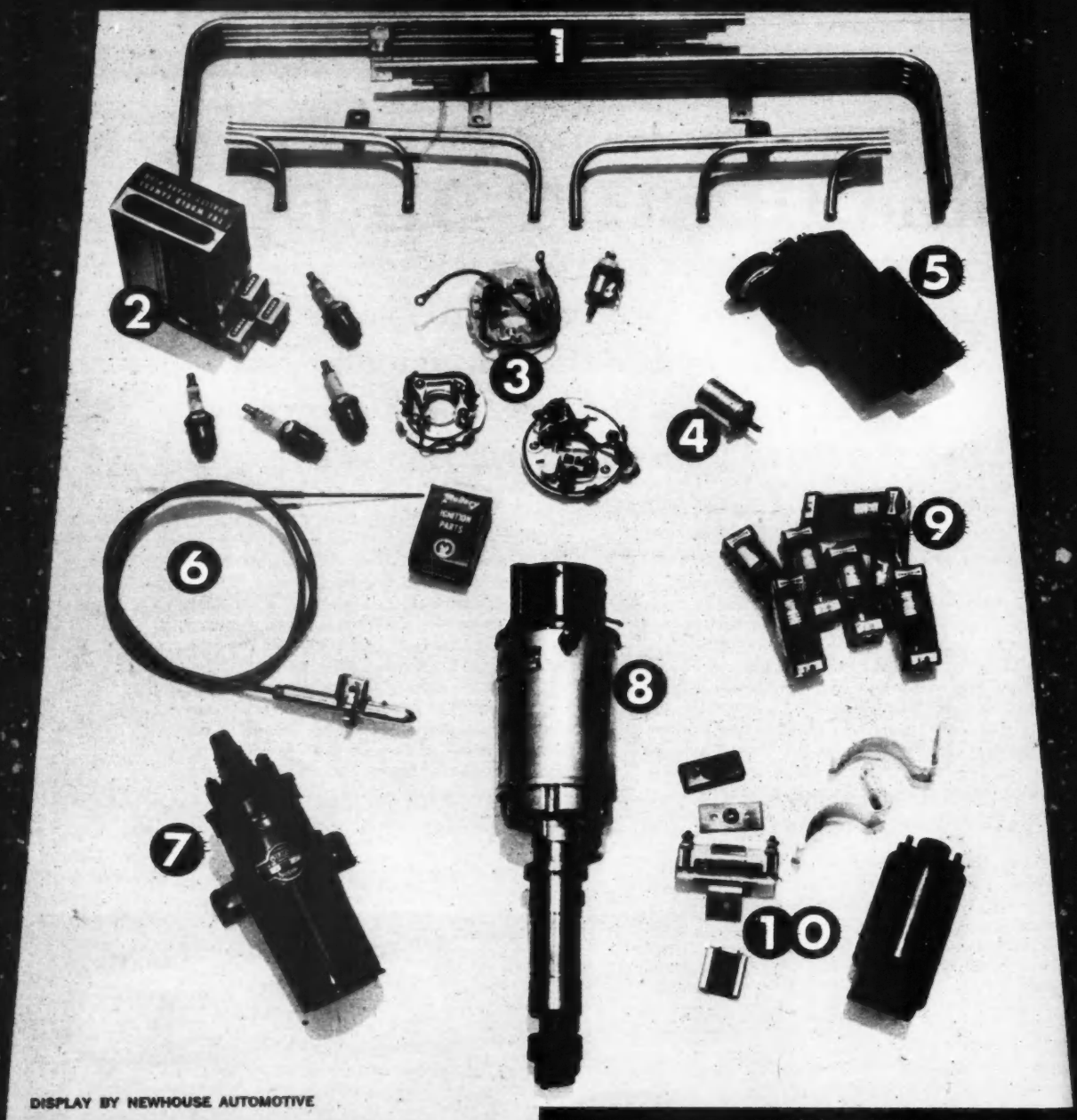
The fiberglass body sits on a ladder-type frame. Engine, transmission, suspension and other mechanical components are from an Austin A-55. Total weight is said to be only 1910 lbs. Performance from the 53-bhp engine should be adequate, but not outstanding. Fuel economy should be good.

One-piece, fiberglass top can be easily lifted off by one person, though it is somewhat awkward. Doors are a full 36 ins. wide, allowing for easy access. Wheels are 15 ins., tires are tubeless whitewalls.

GETTING MORE GO

No. 6 of a series

BUILD A BIGGER FIRE!



DISPLAY BY NEWHOUSE AUTOMOTIVE

1 — Ignition wire looms
2 — Lodge spark plugs
3 — Mallory and Crawford dual-point distributor conversion plates
4 — Large capacity condenser
5 — DSM high-voltage coil
6 — Autotimer
7 — Runbaken oil-cooled high-voltage coil
8 — Vertex magneto
9 — Champion spark plugs
10 — Mallory molded coil

On a reworked engine, potent ignition is a must . . . but even a stocker responds to the urging of a "hot" spark.

by Dean Parker

LOS ANGELES POWER EXPERT Vic Edelbrock recently ran a series of dynamometer tests on a "super stock" 330-hp Pontiac V8 engine. Right out of the crate, tuned to factory specs, the engine developed a peak of 186 hp at 4000 rpm. A check showed that a manufacturing inaccuracy in the spark advance mechanism was holding the advance six degrees below factory specs at high engine speeds. Correcting this, and opening up the carb jets a little, put the power up to 288 hp at 5000 rpm!

Moral: Don't belittle the effect of ignition refinements in your plans for getting more go. "Building a bigger fire" through ignition changes has never had the glamor appeal of hot cams and four-carb manifolds, but no real strong engine can do its best with a strictly stock ignition system. We can do better. Here's how.

SOME FUNDAMENTALS Engine researchers have known for a long time that power and torque output are very sensitive to the rate, or speed, of combustion in the cylinder—and this, in turn, is very sensitive to the *strength and timing* of the ignition spark between the plug electrodes. Some "experts" have said that timing is the whole thing, and any old spark, however feeble, will get the fire started. Bunk! A weak spark will definitely reduce power and torque, especially at high speeds. A big, fat spark is a must to make an engine really go. Remember this in all your hop-up planning.

Most of you know the operating principle of a conventional coil ignition system. Very briefly, we build up a magnetic field in an induction coil with direct current from a storage battery. When the current is cut off suddenly (by the breaker points) the magnetic field collapses; as the magnetic lines of force cut across the secondary windings in the coil a very high-voltage current is induced that will kick a spark across the plug gap in the engine cylinder. We have a distributor with a rotor that routes the high-tension current to the proper plug. It also contains the cam-operated contact points to make and break the primary coil circuit. This "breaker plate" is arranged to rotate in relation to the cam (which is driven by the engine camshaft) to vary the timing of the spark in relation to crankshaft angle. The spark advance system is generally based on weights that we link up centrifugally to change the timing as a function of rpm; or a manifold-vacuum-operated diaphragm can be linked to advance the spark at light loads—or we can use a combination of both systems. Ford products of the '49-'57 era used carb venturi vacuum balanced against manifold vacuum to control the advance.

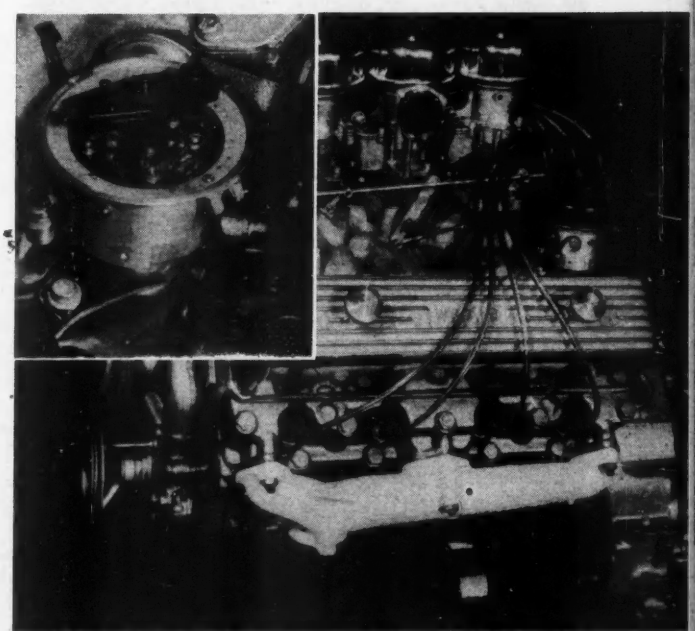
Finally, we have a condenser—generally built into the distributor—that acts as a sort of cushion in the primary coil circuit. It cuts off the battery current very suddenly when the contact points open—both to collapse the magnetic field and to prevent arcing across the points.

And that's about all there is to it. Obviously the possible paths open for improving this arrangement would simply be: increasing the spark voltage; timing the spark more precisely to fit engine demands at each speed and load; and seeing that all wiring, connections, points, condensers, etc. are the best units available, operating at maximum efficiency.

MODIFYING YOUR STOCK IGNITION Modern factory ignition systems have a number of serious shortcomings when we're thinking about optimum full-throttle performance. This is because they must be manufactured within a very tight cost framework, and the setup must cater to the non-existent average driver—who seldom uses full throttle, doesn't take care of his car, and above all demands flawless reliability. So we find stock ignitions with loose breaker plates and wobbly distributor shafts that let the spark advance vary terribly, spark voltage barely able to fire the cylinder at 5000 rpm, a spark advance curve engineered to prevent detonation in a carboned-up engine, low-quality wiring, "hot" plugs that fry under hard driving, etc.

Fortunately, there's quite a lot of special equipment on the market for reasonable prices that you can use to modify your stock system. The simplest modification is a dual-point breaker

continued



Even if you don't go all-out in your ignition modifications, a few simple and inexpensive changes are worth while. A dual-point distributor and good-quality, well-insulated wiring give a big return. Chromed wiring harnesses are a custom touch.

continued

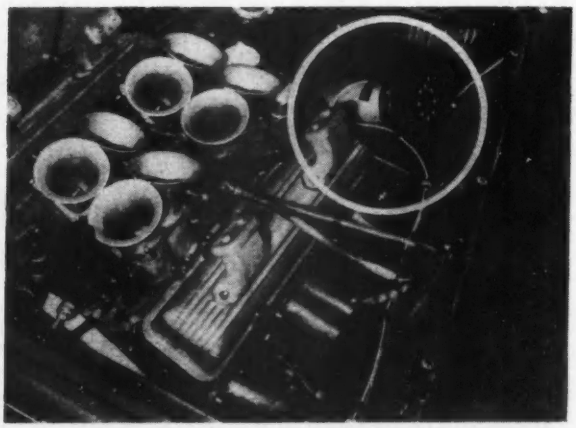
plate that can be slipped in to replace the stock plate in about five minutes. The principle here is to use one set of points to close the primary circuit and another set to open it; have them wired in parallel and have the points positioned around the cam so their closed periods overlap. Result is that the primary coil circuit has about 30 per cent longer to build up voltage at a given rpm than it would with one set of points. We get much more spark voltage when the points break.

It's good to remember in all this that electric current has a certain inertia-like characteristic. The voltage in a circuit doesn't build up instantly when the switch is closed. In an ignition system at high speeds the points open long before the primary coil voltage levels out at its peak value, and this effect gets worse as rpm goes up. Keeping the coil circuit closed longer will help.

Another good move with stock ignition is to replace the stock coil with a good quality high-voltage unit that features more winding, better sealing, better quality wire, and insulation, etc. This alone can increase the effective spark at high speeds by as much as 20 or 30 per cent. Brands would include Mallory, D. S. M., Lucas, Bosch, etc., and prices will generally run between $10 and $20. The new Mitchell electrostatic coil—based on charging and discharging condensers to generate its spark—looks good on paper. And don't forget the new Auto-Lite transistor coil, designed especially for long point life and high spark voltage at the top end. Certainly a dual breaker plate and one of these quality coils will do wonders for any stock ignition.

How about spark advance? We all know you can often get a little more power and torque by setting the static advance (adjusted by rotating the whole distributor body) maybe four to eight degrees ahead of the recommended factory setting. Factory specs have to allow for carbon and poor gas, so you can generally do better if you have a well-maintained engine. Experiment. Keep advancing until the engine either "pings" or runs too rough; then back off just a little.

The spark advance *curve*—advance vs. rpm and throttle opening—given by the automatic advance mechanism is a little more complicated. This is a compromise, too. The factory curve almost invariably gives *too little* advance at low speeds for maximum torque, though the high-speed advance is generally about optimum. Reworking a centrifugal advance mechanism to increase low-speed, full-throttle advance without over-advancing at the top end is complex, precision work. No one but an expert should even attempt it. Some speed shops are set up to do this work, and can do a conversion in a short time for reasonable prices. See if you can look one up. If you can't, your next best move is our next subject.



Lance Reventlow's Scarabs were a spare-no-expense venture, used Vertex mags. Dennis Clark didn't have Lance's resources, but with six 97s, he found mag performance warranted cost.

PHOTO BY DENNIS CLARK

SPECIAL COIL IGNITION Ignition experts have always felt that the *best* way to modify a factory system is to throw it in the ashcan and start all over! Even when you have plenty of spark voltage and an optimum advance curve with a factory system, you still have problems like wobbly breaker plate bearings, slop in the rotor shaft bearings, poor insulation and sealing and inadequate ventilation. The best answer is to replace the complete distributor with one of the special custom jobs from Spalding, Mallory, Jackson, W. & H., etc. These generally feature a special-built casing and cap, ball rotor bearings and precision sleeve bearings for the breaker plate, dual breakers, careful ventilation, high-dielectric rotors and terminal caps, good insulation, quality condensers, and—very important—*you get a custom spark advance curve tailored to your particular engine.*

Each of the companies has a wide variety of springs and counterweight designs in stock that can be combined to give a wide range of advance curves; you describe your car and how you want it to operate when you order, and they'll install the optimum curve. (Incidentally, all these custom distributors can be had with or without the vacuum advance.)

And there's another important plus: Most of these custom ignitions utilize *dual coils* in conjunction with the dual breakers. The idea here is to put half the cylinders on one coil and half on the other, with two entirely separate circuits. This requires two rotor fingers, two breakers, and only half as many lobes on the breaker cam as there are cylinders. In this way the points are kept closed just *twice* as long as with a single breaker and single coil. This gives the coil twice the time to build up voltage. These dual-coil custom ignitions, with quality parts and precision construction all the way through, and an optimum advance curve for your engine, are all you'll need for the hottest road engine.

MAGNETOS Magneto ignition is almost essential for competition cars because it generates its own primary voltage. You don't need to lug along a 50-pound battery. A rotating permanent magnet induces a low-tension voltage in the primary winding of a built-in coil when the breaker points are closed. Then the points open (synchronized with rotor position) to collapse the field across the secondary winding. A distributor finger routes the secondary voltage to the proper plug. Major advantage of a

magneto, aside from eliminating the battery, is that spark voltage actually *increases* with rpm, due to the speed of the magneto cutting lines of force. For engine speeds above 7000 rpm a mag is pretty hard to beat. For road machines the refinement approaches the ultimate. But if that's what you want, there are several companies anxious to supply you with one of several commercial magnetos, converted to mount on your stock distributor drive and with a built-in centrifugal advance mechanism for the road. The choice is yours.

PLUGS AND WIRING A spark plug works under very tough conditions in the cylinder of an engine, and it's got to operate at the proper *temperature* to work right. If it's too cool, oil and carbon will collect on the electrodes and short it out; if it's too hot, the electrodes and insulator will literally "fry" under hard running and ruin the plug in a few miles. The operating temperature of a plug is controlled by varying the length of the heat flow path from electrodes, up the body, and out across the gasket and into the cooling water. (Heat will cross the gasket easier than the threads.) "Hot" plugs have longer bases and more porcelain exposed to heat than cold ones.

Actually the plug heat range that comes on your car from the factory is about right for average driving conditions. But if you do much hard highway or mountain driving—or if you've increased compression, or even for a day at the drags—it's sometimes advisable to drop down a step or two colder. Consult your parts house for heat range rating numbers on various plug brands. Remember, the most expensive plug is not necessarily the best, but a cheap plug is at best a cheap plug.

You can tell something about your plug's operating temperatures by studying the tips after a hard run. A light, ashy, burned appearance indicates the plug is too hot; oil, soot or general blackness suggest it's too cold. Plug condition also indicates carburetor richness or leanness.

Proper plug maintenance is important, too. A good set of plugs may last up to 20,000 miles—*if* they are carefully cleaned and tested every 2500 miles or so. Plugs should be first washed in carbon tetrachloride to remove oil and grease, then blown dry with compressed air. Then a *gentle* sand-blast job and careful removal of all sand particles and topped off by re-gapping to recommended specs. (The wider the gap the more secondary voltage required to jump it.) But if a plug is marginal, replace it. Better yet, replace the set and throw the good ones in the glove box as spares.

Plug lead wires are a vital point in the ignition system. Too much resistance or inadequate insulation can greatly weaken the spark in the cylinder, and sometimes cause destructive cross-firing from one spark lead to another. This has been known to blow pistons and wreck engines. Stock powdered-carbon wire is not too good. Quality leads generally consist of a neoprene insulator (natural rubber is attacked by oil and gasoline) and several strands of stainless steel wire. Spark leads should not be closer than ¼-inch to prevent corona and cross-firing; taping bunches of leads together is never recommended. Rajah clip-on terminal ends and chromed harnesses are nice for the custom ignition setups.

THE OVERALL PICTURE It should be obvious by now that the smart modifier will plan and finance ignition improvements right along with hot cams and dual carbs. It's almost a must with a blower. The exact procedure, as usual, will have to depend on the money available. The first step, of course, would be experimenting with the static advance setting to see if you can get a slight performance increase. Try four to eight degrees before the recommended setting. Next you'll want to try a dual-point breaker plate at around $8. After that maybe a hot coil. Meanwhile, you will want to be thinking of getting that stock spark advance mechanism modified to give more advance at the low end. Check around to find out what speed shops in your area can do this job.

On the other hand, if your budget is not so limited and you feel you could spend $100 or so on a real custom ignition system, you would want to bypass all the above and jump right into special systems like Mallory, Spalding, W. & H., etc. You'll not only have plenty of spark voltage for the high end, but you'll have that important custom advance curve tailored to your engine. A magneto is a possibility here also. And, of course, don't forget the detail refinements like the proper plug heat range, quality spark leads, good coils and condensers. Whether to go into the oddball stuff . . . we just won't recommend. You have to know your ignition to pick the good from the bad. Why not consult recent MOTOR TREND product tests and see what they say?

So remember: Don't be fooled because ignition modifications don't have the reputation for performance that your cams and carbs have. A thousand dollars worth of conventional speed equipment won't make an engine go if the spark is timed wrong or is on the borderline of misfiring. Good ignition is like good brakes—you don't appreciate them until they're not there! /MT

NEXT MONTH we do it without "bolt-ons," strictly from the inside. We'll talk about mild and wild cams, valve gear, and the things that make for higher rpm.

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Unit Bodies

continued from page 29

The body dip was the logical answer. There were a lot of 500-watt engineering problems involved—like finding the optimum angle to hang the body after dipping so the primer would drain off in the shortest possible time (actually about 15 minutes)—but both A.M. and Lincoln finally got to dipping on the '58s. Chrysler will dip their new bodies, too—but with a new feature: They'll dip on Bonderite before the primer (to give a better surface for the paint to cling to) and they'll dip only the lower 18 to 22 inches of the bodies, as they feel most of the corrosion is in this area and any further dipping would be a waste of money.

So scratch the corrosion problem on unit bodies.

Then there's the problem of designing the body for minimum use of materials. Ever since Vincenzo Lancia built the first unit body in 1922 engineers have been designing these things by the seat of their pants, so to speak—almost entirely by cut-and-try, rule-of-thumb, try-it-and-see methods. They'd draw up something in the drafting room that *looked* like it would be strong enough, then they'd build a model and try it. If the body squeaked too much out on the road, or twisted too much on the test rack, or didn't show acceptable door fits after 25,000 miles of punishment, they'd just go back in the drafting room and *start adding beef*. Usually the car ended up weighing several hundred pounds more than it should have, with only part of the metal in the body being stressed as it should be. And, of course, with sheet steel selling for eight cents a pound, this meant that the body *cost* that much more to build. All this because automotive science did not use the mathematical processes available to analyze these complex body stresses on paper.

Or, that is, we didn't use them until Chrysler Engineering got to work on the problem a couple of years ago. What they did was to reduce the body stress variables to *precise mathematical equations* and then run these equations through their big electronic computer machines. This was never practical before the advent of the computer machines because there were so many variables that it would have taken an army of slide rule mathematicians *years* to check all the possible combinations. With the computers these calculations were done in minutes. The engineers laid aside their slide rules and just fed variables into the machines on punched cards until the thing told them which combination of body panels and underbracing would give the maximum overall stiffness and rigidity for the minimum weight. Beautiful engineering—just like they design wings and fuselages for modern jet fighters and bombers.

And the result: The 1960 Chrysler unit bodies promise to be the most advanced designs in automotive history in terms of strength/weight ratio. They will be quieter, more solid than any car bodies you've ever known, after 100 or 100,000 miles. They'll be lighter than comparable frame-body cars.

Finally we have the old cost problem. Chrysler has a few tricks here, too. Actually, a big factor in the tool cost problem with unit bodies is the fact that the whole body has to be welded up in one piece in one huge "jig" or fixture. In other words, the individual panels and sub-assemblies are separately inserted in the jig, locked in place, and then welded together. These body framing jigs are fantastically expensive things—and you need a whole battery of them for real volume production. Furthermore, minimum restyling changes on the body require relatively expensive changes in these production jigs. The whole deal makes a very tough problem in our highly competitive auto industry.

But maybe there's a way out here, too. Imagine a unit body composed of several major sub-assemblies *bolted* together instead of welded. Why not? If certain types of modern fastenings were used, and if there were no appreciable flexibility in the joints, the final body would be as rigid as if it were welded together . . . and yet we wouldn't need those big expensive framing

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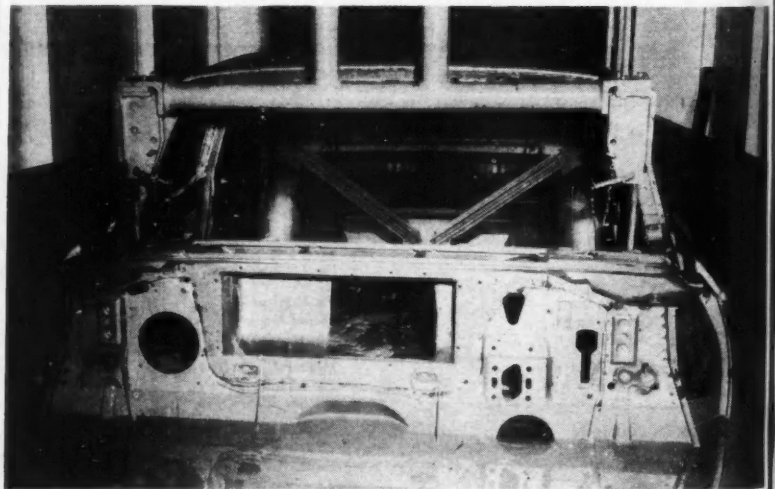

Chrysler's unit bodies for '60 will pass through a series of seven baths—cleaners, rinses, phosphate coatings, primer. This rust-proofing dip provides 18-in. protective coating at bottom.

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Last year our congress made it a federal law that automobile manufacturers be required to post the "suggested retail price" on the window of every car sold. This required posting of a price was new but advertising the "suggested retail price" was a standard practice before the war. Remember $909 FOB Detroit? After the war when cars were hard to get some dealers were taking money under the table to put your name on a list for a new car. It didn't seem reasonable to advertise "suggested retail prices" if no one could buy at these prices. So they abandoned price advertising. About this time the "giant pack" was born. The momma and daddy of the "pack" were the off brand car dealers, especially those trying to break into the auto field. They would put absurdly fictitious prices on their new cars marking their profit so high they would be able to offer a new car buyer several hundred dollars more for his trade in than dealers of the more popular makes.

This type of phoney baloney proved to be such a powerful lure to the shopping public that many other dealers were forced to use this technique in self defense. Since it was legal for a dealer to charge any price he wanted for his cars you had a period of compound confusion with one dealer charging $3300 while another charged $2600 for the same car. After an investigation into this packing and price of U.S. cars a bill was passed to require the manufacturers to post their "suggested retail price." The cost to the manufacturers for preparing this price sticker is estimated to be between $11 and $20 and is passed on to you in the purchase price of your car. Now a very good question you might be asking yourself at this point is the information on this sticker worth $11 and what good has posting these "suggested retail prices" accomplished? Undoubtedly it has been helpful. It eliminated "the pack" and offered everyone the same price from which to start bargaining for a car. But as before the more informed or shrewd buyer can still buy at a price several hundred dollars cheaper than the average buyer. Car buying is, now, and always will be a horse trading business (especially when there is a trade of cars involved). Human nature being what it is the better horse trader gets the better bargain. The current "suggested retail prices" for automobiles are based on what the dealer pays the factory for a car plus a fictitious profit that scales from $355 on one model Rambler to $3200 on the model Cadillac. If you are a realistic car buyer you will know that these prices are no more the "real market price" at which cars are sold, than they have been in the past. You will also know that you must bargain your way to the final price you pay for any car. In the past it has been necessary for you to trust to your individual luck and shrewdness when bargaining for a car, shopping one dealer after another until finally buying at your lowest price; but never quite sure if you made a good buy or had simply passed among the dealer fraternity. This type of guess buying is no longer necessary for we have published a car price book called the Auto Bluebook that will revolutionize your car purchasing. You will price the car you wish to buy from your easy chair. Instead of going from one dealer to another looking for the best price, you will open your Auto Bluebook. Look up the "wholesale dealers' cost" for any new or used car then add a fair profit for the dealer and make your offer to him. Since your offer will be a fair one you will purchase your car at its lowest reasonable price. You will also have the satisfaction of knowing exactly what you paid. If you are trading your car in you will find its wholesale/retail value in your Auto Bluebook and can subtract this sum from the price you are paying for your new car giving you the difference you should pay. With your Auto Bluebook you can determine how much your payments will be on any car. Though it looks like a magazine from the outside it's pure informational gold on the inside and unlike anything you have seen before. You will read with fascination and profit our proven formula for having a new car every year for a depreciation of $200 or less or a late model used car for $100 or less. Whether you are buying a car now or much later, we are sure you will find the "wholesale/retail price" structure of the giant automobile industry fascinating and rewarding reading.

CONTINUED ON PAGE 78

Unit Bodies

continued from page 54

jigs. Not only would the original tooling cost be reduced, but it would be cheaper and simpler to change roof lines, fender lines, etc. for annual model changes. We hear this is the way the new Chrysler Corp. bodies will be built. (And, incidentally, it is very interesting to note that the body of the newly announced Triumph Herald from Britain is built this way—though the car does have a frame under it. Could this be the start of a revolution in body construction, where we bolt sub-assemblies together instead of welding them in expensive fixtures? Time will tell.)

IS THIS THE ANSWER? So *will* Chrysler's new '60 bodies revolutionize the industry, like the engineers who developed them think they will? There is certainly plenty of evidence that unit construction is the body construction method of the future. Note that all the small cars coming up from the Big Three are to feature some form of unit construction. In these cases new plants *had* to be built anyway, so they were built up for unit construction. One might almost conclude that no new body plants will again be built specifically for frame-body construction. Furthermore, it is well known around industry engineering circles that the weird frame designs of the last few years, required to get super-low floor lines and lower body height, have substantially reduced the overall stiffness of the frame-body combination. Problems of body squeaks, rattles, cowl shake, poor panel fits, etc. are much more acute today than they were five years ago. Unit construction would solve most of these problems overnight. Add to this the potential savings in weight and production costs and you've got a mighty tempting package. Admittedly the need to build entirely new body and assembly plants—or else completely rebuild existing facilities—will delay the switch in many cases. But plants wear out and have to be rebuilt anyway. When that day comes, what then? Frame or frameless?

There is one problem we've saved for the last. We don't feel this problem is serious enough to kill the future of unit bodies in our auto industry, but it's a pretty sure bet that Chrysler will feel its sting in the next two years. This is the problem of *glass area vs. body rigidity*. The styling trend today is definitely toward more and more glass area and yet we all know that glass is not a good structural material, either from the standpoints of cost, weight or stiffness. When we're trying to spread loads evenly over a body we can't have over half the area above the belt line in glass. Windows have got to be smaller, metal panels larger. The '60 Chrysler bodies are definitely down on glass area. To some eyes this will hurt the looks. To others they may look better. Maybe Chrysler advertising can sell the new look to the man in the street. Only time will tell. Anyway, right now, the glass area problem may be the toughest hurdle unit construction has to face in the next few years—until somebody makes a breakthrough with a good transparent, scratch-free structural material, either glass or plastic.

Chrysler has really got something for '60. They'll *start* something . . . but it may be a while before the job is finished! /MT

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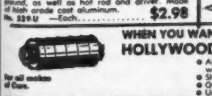
No. 3247 —Each $2.98

"Don't Push Me" CAR PLAQUE



New and different! Large 5"x9" car plaque with the saying "Don't Push Me"—I'm Pedaling As Fast As I Can" embossed on a black background, as well as hot rod and driver. Made of high grade cast aluminum.

No. 3210 U ..... Each $2.98

10 Brand New Car Plaques

New Eye Catching Design—For the Individual —For Any Car

No. 329 C — No. 329 D — No. 329 H — No. 329 K — No. 329 M — No. 329 N — No. 329 O — No. 329 P — No. 329 R — No. 329 S

Ground raised letters & design. Paint baked on and bonderized. Leatherette-like background. Rustproof clips to mount. Heavy cast aluminum. Large size 5"x9"

All Nos. Each $2.98

PIN STRIPING

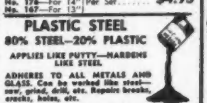
The Newest and Latest Custom Design Choice of White, Gold, Black, or Red

Ready made original design striping, easily applied in minutes. Can be applied on any clean, dry surface. Will not chip, peel or fade. Kit contains fifteen decals in nine different designs up to 4½" long.

Will stripe an entire car; fenders, trunk lid, hood, sliding and other parts. Specify color when ordering. White, Gold, Black or Red

No. 238—POSTPAID. Per Kit $1.00

Change Any Black Tire to Rubber WHITE SIDEWALLS



Not painted on, not cemented on, but a Permanent White Rubber Disc with molded fin that fits between bead of tire and wheel rim. Hugs the tire wall and stays out under all weather conditions. Has the appearance of regular whitewall tires. Can be removed and re-used on different tires. Fits all cars—tubeless or tube tires. Sold in sets of 4.

No. 782—For 13"		
No. 783—For 16"	POSTPAID	
No. 176—For 14"	Per Set	$4.95
No. 167—For 15"		

PLASTIC STEEL

80% STEEL—20% PLASTIC

APPLIES LIKE PUTTY—HARDENS LIKE STEEL

ADHERES TO ALL METALS AND GLASS. Can be worked like steel—saw, grind, drill, etc. Repairs breaks, cracks, holes, etc.

A new material with unlimited uses. Can be used in impounding, camouflaging or customizing. Apply like putty with any flat item and allow to harden. Can be worked like steel—grind, cut, drill, tap, etc. Can also be used as a bonding agent between two metals.

Each kit contains enough material for many uses—full instructions included.

No. 910—Per Kit. POSTPAID $2.25

T-BIRD TYPE EMBLEM

Modern designed metal emblem, consisting of symbolical Thunderbird design in glistening chrome with red and white color trim. Size: 4⅝" x 2¼". Easy to mount—self-adhering—no holes to drill. Just strip off backing and apply. Stays permanently on any clean smooth surface. Can be placed anywhere, on door, trunk, body, fenders, skirts, continental kit, etc.

No. 829 ..... Each Postpaid $1.00

AH-OOO-GAH Chromed HORN

Here it is for the sport car or hot rod enthusiast. Not a vibrator or other substitute but a genuine motor driven horn. State 6 or 12 VOLT

No. 60—POSTPAID $12.60

WHEN YOU WANT PLENTY OF NOISE—INSTALL A HOLLYWOOD NOISE MAKER MUFFLER

- All Steel Construction with electrically welded seams.
- Shell length only 11 inches long.
- Overall length 14". Diameter 5".
- Universal end caps with bushings make this muffler adaptable to any size tailpipe.
- Complete with clamps and bolts. $3.98

For all makes of Cars.

THE MUFFLER WITH THE LOUDEST R-O-A-R! 4 Straight-thru construction with perforated inner core. No Packing—No Baffles.

No. 861 —Each .....

J.C. WHITNEY & CO. 1917 Archer Ave., 029 Chicago 16, Ill.

Spun Aluminum SNAP-ON RACING WHEEL DISCS

NOTE: The SNAP-ON Fingers Hold on the Wheel securely for easy installing and best removal.

For 14", 15", or 16" Wheels.

Designed for beauty — Engineered for speed. More speed—cuts down wind resistance. Snaps on securely to wheel—will not affect wheel balance. Can't shake or fall off. These new spun aluminum racing wheel discs—engineered with gentle curved surface—reduces wind resistance to a minimum—has no identation or projections. Their sleek — graceful lines—and smooth aluminum finish adds beauty to all cars. Easily installed. Sold per each or in sets of 4. Specify 14", 15" or 16".

No. 357 ..... $9.95 | No. 376— Each $2.75

Set of 4 —

NEW SHOCK OVERLOAD SPRINGS

Installs Over Present Good Shock Absorbers.

Heavy coil springs carry heavier overloads with a level ride—no bottoming.

UP TO 2000 LBS. ADDITIONAL LOAD CARRYING CAPACITY.

Easy to install—anyone can install in minutes. No special tools required. Slips right over present shock absorbers. No more sag and drag. No car bottoming. Fits almost all makes & models. Increases road clearance.

Fits most rear airplane type shock absorbers. Specify make, year and model of car when ordering.

No. 535—Per Pair $6.95

CAST IRON EXHAUST CUT-OUT

For All Cars with Exhaust Pipes 1½" to 3½"

Exhaust tone is controlled from the dash. Can be used as a cut-out in the country and closed in restricted areas. Can also be used to operate two different toned mufflers. Sturdy cast iron construction. Easily installed.

No. 613—Each $3.75

MELLOW TONE Fiber Glass Packed MUFFLERS

Custom designed and engineered to fit each make and model of car—no alterations necessary.

Increases horsepower, increases gas mileage, straight-thru construction, no back pressure, no high pitch irritating noises, deep powerful round-thru-the-tone tones. Be sure to Specify Make of Car, Exact Year & Model, Type of Transmission, Single or Dual Exhaust.

No. 236—Each $4.95

MINI Super CHARGER

20% More Gas Mileage by Actual Test. BOOST HORSEPOWER. Increases Air-Fuel Charge Efficiency. Greatly Improves Motor Performance.

MINIsuperCharger consists of a revolving impeller "blower" & automatic air "breather" valve. Blower drives an increased volume of air to the fuel charge with whirlwind force. Results: more moisture enters the cylinders in a more powerful highly explosive state . . . eliminates over-rich mixtures & fuel waste. Better, cleaner combustion, reduced "ping", less oil dilution, less valve, plug and longer engine life. Eliminates "vapor lock". Easily installed. Satisfaction guaranteed.

Specify year, make, model of car or truck and make of model of carburetor.

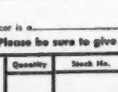
No. 311—Single throat Carb.	Postpaid $ 9.95
No. 312—Double throat Carb.	Postpaid 11.95
No. 313—Four throat Carb.	Postpaid 13.95

PAY LESS THAN EVER for a Star Fire CAP SPINNER

Beautifies the Car the Easy Way. Dresses up the hub cap. Gives your car that custom look. Smartly chrome plated on stamped steel. Easily attached — no special tools needed. Can be used on all hub caps.

No. 883—Each ..... Postpaid $1.79

BERMUDA CLANGING BELL



It's the New "Rage"!

Gives a most amusing and commanding two-tone bell sound. Easily installed under car floor by driver's seat. Step on plunger

Highly polished. Fits any car.

Stock No. 49—POSTPAID $5.00

Add A Booster Horn For Extra Safety

NOW ONLY $5.95

BOOSTS HORN WARNING POWER 300%

With Booster Horn, sound reaches 3 full cars ahead.

Regular Horn reaches one car.

The addition of this booster horn produces a blended penetrating, yet pleasant, tone that can easily be heard at least three car lengths ahead when windows are closed. This type of added horn is now standard equipment on the Cadillac Eldorado and Chrysler Imperial—optional equipment on several other new model cars. With this booster horn added to original equipment horns, you are able to give advance warning that is needed on the highway and in heavy city traffic. The tone is not blasting, harsh or startling, but a pleasant harmonious far-reaching sound that commands attention.

QUICK, EASY INSTALLATION—Installed in conjunction with present horns, universal mounting bracket is furnished—no complicated wiring necessary. Size: 5⅛"x13-9/16"x6-9/16" high. Red motor cover, black projector. Available for 6 or 12 volt.

No. 500	—6 Volt	Each
No. 501	—12 Volt	$5.95

TRANSMISSION CONVERSION KITS

- Use same shift pattern as standard floor board shift.
- Designed for fast shifting.
- Easy to install—with just a few hand tools.

This kit permits conversion of the rugged heavy duty steering post shift transmission to the preferred floor board shift. You get the same results out of a conventional transmission (has same heavy gears) as the original standard floor board transmission. Kits are designed and built to take it. Complete with all necessary parts and instructions for installing. Kits require no welding but some drilling and cutting is necessary.

Year	Make	Stk. No.	Kit
38-58	Cadillac (also LaSalle)	No. 233-A	$ 29.95
40-54	Chevrolet	No. 234-A	29.95
55-58	Chevrolet	No. 234-B	29.95
49-54	Ford Standard & OD	No. 234-D	29.95
55-57	Ford Standard Only	No. 234-E	29.95
49-51	Mercury Standard & OD	No. 234-F	29.95
L51-54	Mercury Standard & OD	No. 234-G	29.95
55-57	Mercury Standard Only	No. 234-H	29.95
49-50	Oldsmobile	No. 233-B	29.95
1958	Oldsmobile	No. 234	N29.95

22" GEARSHIFT EXTENSION for Floor Board Gear Shifts

Available in long or short models. Made of enamel finish, 11/16" O.D. steel tubing is fully 22" long with ¾" USS thread on one end. Can be easily cut off at bottom for shorter length. I.D. permits gear shift extension to be slipped over most any size gear shift lever.

No. 222-A	—Black	$3.50
No. 222-B	—Chrome. Each	5.00

SOLID ROUND 1⅞" GEAR SHIFT BALL

- Oversize gear shift ball—fits the palm for positive grip.
- Beautiful polished solid aluminum.
- Extra size—extra weight—helps keep shift lever from vibrating.
- Drilled and tapped.

5/16" SAE Thread	No. 230-A	Each
5/16" USS Thread	No. 230-B	$2.50
3/8" SAE Thread	No. 230-C	
3/8" USS Thread	No. 230-D	

BULL NOSE MOULDING

One piece unit extends from the windshield to the grill-rolled from quality stainless steel. Permits "shaving" of the hood at a minimum of expense. Replaces the original unit in the same. Ready for welding, cutting, drilling required.

No. 845—49-52 Chev. One Piece Each $3.50

No. 846—53-54 Chev. One Piece Each $3.95

No. 847—49-52 Chev. 3 PIECE BULL NOSE MOULDING for use with car ornament. Per Set $2.00

TAIL LIGHT VISOR

FOR FORDS 1932-56 Stainless Steel. Easy to Install.

No. 220—POSTPAID. Pair $1.98

ADJUSTABLE LOWERING KITS for 58-59 BUICK, CHEV., CADILLAC, PONTIAC

- Adjustable 2" to 4" drop.
- Gives any car that ultra-low custom look.
- Lowers center of gravity for added safety.
- Can be easily installed in minutes.
- No need to remove coil springs from car.

With these adjustable lowering kits you can quickly and easily lower the rear end of any car from 2" to 4" as desired. simple adjustment feature makes it easy to adjust exactly to height desired. Easily installed without removing coil springs from car—no alterations to frame, springs or axles are required. It's easy to achieve that long low-low close to the ground look with these adjustable lowering kits. Kits are complete with 4 specially designed brackets and 4 special bolts and nuts, plus easy to follow instructions. Fits the rear coil springs of the following cars:

	Stk. No.	Per Kit
58-59 Buick	No. 495	$5.95
58-59 Cadillac	No. 495	5.95
58-59 Chevrolet	No. 636	5.35
58-59 Pontiac	No. 496	5.95

BOOKS THAT TELL AND SHOW YOU HOW—

To Fix: Your Ford— Your Chevrolet— Your Plymouth—

FIX YOUR CHEVROLET HAND BOOK

For all models 1940 thru 1957. 240 pages of instructions and illustrations.

No. 128—Each—POSTPAID $2.95

FIX YOUR PLYMOUTH HAND BOOK

For all models 1946 thru 1957. 232 pages of instructions and illustrations.

No. 118—Each—POSTPAID $2.95

FIX YOUR FORD HAND BOOK

For all models 1932 thru 1958. 240 pages of instructions and illustrations.

No. 119—Each—POSTPAID $2.95

Ford Model "A" Service Manual

All repair information on model A's.

No. 276—Each—POSTPAID $1.00

Renault (Dauphine) Owner's Hand Book.

For repair and maintenance. Over 185 pages with 150 illustrations.

No. 22—Each. POSTPAID $3.00

Volkswagen Owner's Hand Book.

Over 144 pages with 150 illustrations and complete care and operation.

No. 915—Each. POSTPAID $2.00

Vauxhall Maintenance & Repair Book.

For all models from 1933 thru 1957. 241 pages, over 100 illustrations.

No. 270—Each. POSTPAID $2.25

English Ford Maintenance & Repair Book.

For all models from 1934 thru 1958. 242 pages, over 133 photos, drawings.

No. 271—Each. POSTPAID $2.25

Chevrolet Speed Manual.

How to speed tune Chev. and GMC engines. Complete how-to-do-it information. 128 pages.

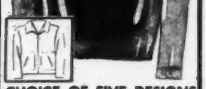
No. 260—Each. POSTPAID $2.00

Model A&T Ford Owner's Hand Book.

Contains 576 pages of information and engines operation and maintenance of both "T" and "A" models.

No. 361—Each. POSTPAID $6.00

Car Club Jackets



CHOICE OF FIVE DESIGNS

Whether your sport is hot rods, sport cars, boats, ¼ midgets or chess, here is a jacket that fits any pocketbook or club treasury. It's a colorful, high quality coat that is carefully tailored from the finest Don River sanforized, washable poplin in popular wind-breaker styling. Has such desired features as roomy corded pockets, easy-sliding zipper front, comfortable side elastic inserts—and it is treated with DuPont "Aridex" to make it water and spot repellent. Insect-lacking cuffs. Light, but serviceable enough for work, economical enough for casual wear.

This classy jacket is available in any of the 5 designs shown—"NO CLUB—LONE WOLF", "HAVE GOODIES—WILL TRAVEL", "ROAD DEVILS", "NIGHT PROWLERS" or "CAM BUSTERS", which are permanently silk-screened on back of jacket, and then flocked for a velvet-like effect. Choice of 3 colors: Red with White emblem, Blue with White emblem, or White with Black emblem. Men's sizes: Small, Medium, Large, or Extra-Large. When ordering, be sure to specify jacket color, size and emblem desired.

No. 592 ..... Each $6.95

STYLE LEADER CONTINENTAL KITS

Styled to compliment and blend with the contour of the car. This kit is engineered for durability and trouble free operation. Special design locking device holds kit in rigid position, eliminating rattles and loose or sagging mountain. Kit folds back allowing easy access to trunk. Carrier is well balanced for easy swing back. Comes complete with Face Plate, Tire Ring, Spring Shield, Instruction Sheets and all necessary fittings for easy installation. All parts are prime finished. Choice of Prime or Stainless Steel Ring.

When ordering:—Order (1). Kit (including Tire Ring). (2). Face Plate Desired. Specify year, make, model and tire size.

Year	Make & Model	Stk. No.	Tire Ring Prime With Stainless Steel Tire Ring
49-58	Chev. (All Exc. 58 Corvette)	334	335
49-58	Ford (All Exc. 58 Skyliner)		
55-58	Mercury, All		
55-58	Plymouth, All	Each	Each
56-58	Studebaker, Hawk Series	$49.95	$58.95
1957	Thunderbird		

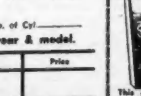
NEW! CUSTOM STYLED CRUISER FENDER SKIRTS For ALL CARS

- New design that blends into fender line—gives the car a longer, continuous flowing look.
- Covers the wheel well for that sleek, streamlined appearance. Makes it look longer and lower.
- Positive locking device — prevents rattle, can't shake or fall off.
- Easy to install.
- 44" long—covers the flare and beading of the fender.
- Made of heavy gauge steel—prime coated —ready for finish coat.

Year	Make & Model	Year	Make & Model
BUICK		CHRYSLER	
50-52	2-Door only	57-59	All Models
1953	All Models	DE SOTO	
CADILLAC		49-54	All Models
55-59	2-Door only	57-59	All Models
CHEVROLET		DODGE	
49-52	2-Door only	47-54	All Models
53-54	All Models	56-59	All Models
1955	2-Door only	FORD	
1956	All Models	1949	2-Door only
1957	2-Door only	1950	All Models
1959	2-Door only	1951	2-Door only

Year	Make & Model	Year	Make & Model
FORD		PLYMOUTH	
52-59	2-Door only	41-52	All Models
HUDSON		53-54	2-Door only
1952	All Models	55-59	All Models
MERCURY		PONTIAC	
49-51	All Models	49-52	2-Door only
55-59	All Models	53-56	All Models
OLDSMOBILE		57-59	2-Door only
1952	2-Door only	WILLYS	
1955	2-Door only	53-54	All Models
56-57	2-Door only	No. 250	$16.95
1959	All Models	Per Pair	

NEW EXHAUST CUT-OUT



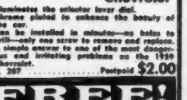
Exhaust tone is controlled from the dash. Can be used as a cut out in the country & closed in restricted areas. Or may be used to operate two different toned mufflers. Well constructed of heavy plate steel. Strengthens the exhaust pipe.

No. 66—For All Exhaust Pipes through 2" diameter

No. 318—For All Exhaust Pipes 2⅛" thru 2½" diam.

POSTPAID EACH $2.89

The Light Detroit Forgot! Gear Shift Selector LIGHT For 1959 Chevrolet

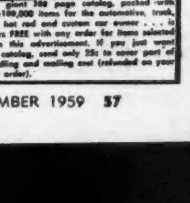


- Illuminates the selector lever dial.
- Chrome plated to enhance the beauty of the car.
- Can be installed in minutes—no holes to drill—only one screw to remove and replace.
- A simple answer to one of the most dangerous and irritating problems on the 1959 Chevrolet.

No. 207 ..... Postpaid $2.00

FREE!

NEW 388 PAGE CATALOG— BIGGEST IN OUR HISTORY!



This giant 388 page catalog, packed with over 100,000 items for the automotive, truck, car, hot rod and custom car owner . . . is yours FREE with any order for items selected from this advertisement. If you just want the catalog, send only 25c to cover part of handling and mailing cost (refunded on your first order).

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Address .....

City ..... Zone ..... State .....

☐ Catalog sent Free with your order. Check here if you want Catalog only—send 25c.

STATE—My car is a ..... Year ..... Model ..... No. of Cyl .....

NOTE! Please be sure to give all information such as color, size, body style, make, year & model.

	Quantity	Stock No.	Description	Price
Ship following order on a				
Money Back Guarantee of Satisfaction				

REUPHOLSTER with a BRUSH!

Renew dull, faded, worn leather or vinyl plastic upholstery. Car, plane or boat seats, headliners, side-panels will look new in any color. Redesign, customize new or used interiors. You can change color too! Easily applied brush or spray. RamCote Flexible Finishes (not a paint) impregnates leather or vinyl plastic upholstery. Won't chip or peel. Fadeproof, waterproof. Use on home & lawn furniture. Write for free information, color chart and dealer location.

RAMCOTE FLEXIBLE FINISHES
Restores — Colors
Protects Leather, Leatherette or Vinyl Plastic

RAMCOTE, 1141 W. 69th St. Chicago 21, Ill., Dept. MT-9

Fires both .22 short & long ammo.

This sensational NEW 6-shot Rosco Vest Pocket .22 long revolver would be a tremendous value at 3 times its price. Made in W. Germany, it is a tight, well-made, exceedingly accurate handgun. Fires easy-to-get Win., Rem., Western & Peters .22 Long & Short ammo. Features side gate loading, trigger adjustment, screw-in ejector rod. Has STEEL RIFLED BARREL with blade front sights. Easy and fun to shoot. Terrific for target shooting, varmint hunting or as a home defense weapon. Only $12.95. Leather holster $2.95. 100 rds. of .22 short french ball ammo only $1. Shipped F.O.B. Los Angeles, express charges collect. Send cash, check or M.O. COD's require $7.50 deposit. Satisfaction guaranteed. **Purchasers must be 18 years old.** Res. of L.A. and vicinity, please purchase at our store.

SEAPORT TRADERS, INC., Dept. MT-9
1221 S. Grand Ave., Los Angeles 15, Calif.

AVIATION CAREER

SPECIALIZED EDUCATION / PROFESSIONAL TRAINING ... only 16 months to 2 years

Top-pay prestige positions, bright future in aviation. Job opportunities waiting for you as soon as you're ready. Airframe and Powerplant Technician, Aeronautical Engineering Technologist, Business or Executive Pilot. Classes in Miami.

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REPAIR MOST EVERYTHING MADE OF METAL

Home appliances, auto parts, farm & garden equipment, toys. Make and repair playground equipment, lawn chairs, tables, ornamental iron work, gates, wagons, etc.

Solder, heat, bend, and straighten with terrific heat from arc torch. Cut and weld up to ¼" steel plate. A million uses for Home, auto, farm, inventors, factories, etc. Works from any 110 volt plug-in. Complete with dark welder's mask, arc torch, supply of welding and brazing rods. Solder, flux and complete welding instruction Book. Attractive—portable—efficient—durable—1 year guarantee. Wt. only 4 lbs.

SEND ONLY $3.00 (cash, ck, mo) and pay postman $9.95 plus COD postage on arrival or send $12.95 and we will send postpaid. Ideal gift for mechanically minded home owners, relatives, friends. Order now for early delivery. Available only from:

MIDWAY WELDER Dept. DAG-9, Kearney, Neb.

Shopping FOR YOU AND YOUR CAR

by Len Griffing

ADDITIVES—USES AND LIMITATIONS

Most every oil or fuel additive works by chemical action; that is, it is usually some kind of solvent. If the additive is used to reduce oil consumption, it dissolves the gum that holds the carbon that is clogging the rings. Once loosened, these deposits are suspended in the oil and the rings are able to perform their function. This consists of scraping all but an ultra-fine film of lubricant off the cylinder walls, and holding combustion pressures within the combustion chambers. Depending on the purpose of the additive, the valves, combustion chambers and the fuel system may also be cleaned out. If these are the things causing trouble in your engine, a good purge will probably do a lot of good.

For example, I tried a can of Pyroil RX-1 and RX-2 in an old '51 Rambler with 86,000 miles on the odometer. The car had been getting 200 miles to a quart of oil. After the RX-1 had been run through the carb and RX-2 added to a fresh crankcase of oil, the oil mileage per quart was increased to 280 miles. This represented a 40 per cent reduction in oil consumption.

In this case, the rings were very dirty, very worn, and had lost their tension. The Pyroil removed some of the deposits from the rings, and this was responsible for the increase per quart. The Rambler still burned some oil because there is no additive that will put metal back on worn rings or retension them after they fatigue.

The moral is: do not expect miracles. If the engine is worn out, it's best to get it rebuilt; on the other hand, if it's just dirty a good purge will help a lot. But even if it's completely gone, a cleaning may cut down a little on some of the evils and help you live with it for a while.

Incidentally, Pyroil has an offer exclusively for MOTOR TREND readers (see page 13). The coupon is worth a dollar toward the purchase of RX-1, RX-2, or RX-3 transmission additive.

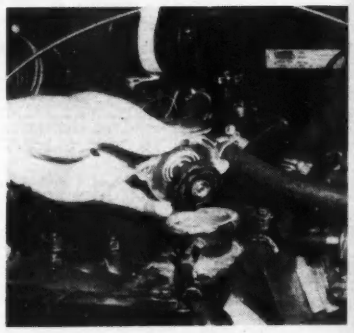
COOLING SYSTEMS

Stopping to replenish fuel one day last week, I noticed another customer drive in with his cooling system just about boiling over. The attendant took a look and immediately advised him to remove the pressure cap. Fortunately, I was able to convince this motorist that what he needed wasn't a non-pressure cap, but rather a replacement for his present cap, which was defective. It was a pressure cap that was bleeding off the pressure. In a marginal cooling system, a new pressure cap was his last hope of keeping his engine going on a hot day.

The theoretical boiling point of water is 212°F at atmospheric pressure. By putting water under pressure (which is exactly what a pressure cap does) each additional psi raises the boiling point three degrees. Thus, a cooling system using a 14 psi pressure cap will not boil until the temperature reaches 254 degrees. And, the hotter the cooling water becomes, the more heat (BTU) is dissipated to the air, since heat transfer is a function of the *difference* in temperature of the air and the cooling water.

I phoned John Hennow for more information. (John is the West Coast rep for Wayne pressure caps: Wayne Metalcraft Div., E. Edelmann & Co., 2332-56 W. Logan Blvd., Chicago 47.) John told me that most pressure caps don't fail, but rather the filler neck of the radiator becomes dented by water cans, etc. This breaks the seal, and you don't have pressure without a seal.

As the pressure is reduced, the efficiency of the water pump falls off with it. Under atmospheric pressure a water pump doesn't work too well because of cavitation (it stops moving water). A pressurized system makes



the water denser. Wayne's research shows that for a water pump to approach 100 per cent efficiency, the system must be under 14 psi pressure. What seems to scare the average motorist is that even though more heat is being dissipated, the engine is indicating a higher temperature.

An engine likes to run hot: 200°F is not overheating. High running temperature improves fuel economy and prevents the formation of mayonnaise-like sludge in areas bathed in lube oil. The limiting factor is the point at which the cooling water boils.

Anything you can do to raise the boiling point of the cooling system is advisable. On my own car, I operate a seven psi cap in conjunction with a quite strong solution of ethylene glycol (permanent anti-freeze). This combination keeps the cooling system immaculate, and raises the boiling point to about 275 degrees. This is the point at which I start worrying about the temperature of my oil; but that's another subject.

DO THE JOB YOU LIKE

In the course of putting a magazine together every month, we have occasion to talk to dealership service managers, truck fleet operators and small garage owners. They have one common problem: getting qualified mechanics to work for them.

We all, at one time or another, have had a recently-repaired car break down. Sure, the garage makes the job good; but they can't make good your time and aggravation.

Just for the record, they like this even less than you do, but it seems there are more

continued on page 60

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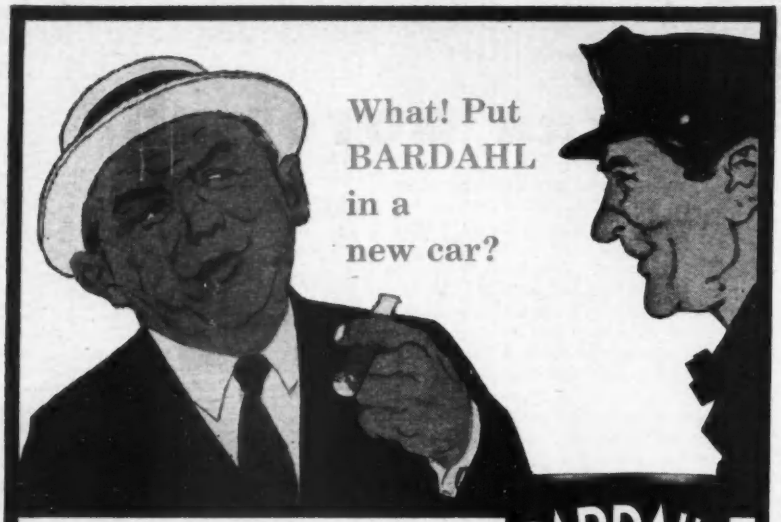

Best way I know to *keep* it new, mister. Add Bardahl right from the start. Bardahl penetrates tight, close-tolerance parts. Won't get squeezed out or burned off. Keeps rings and valves clean. Now's the right time to add Bardahl, mister—before there's wear. And add it every time you change oil.

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Shopping

continued

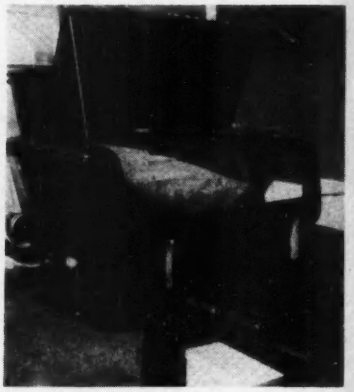
cars and trucks needing work than there are qualified people to work on them. As a result, many repair jobs are sloppy while there are endless opportunities waiting for trained mechanics.

To find out for myself just what is available, I asked National Schools (Dept. DW-89, 4000 S. Figueroa St., Los Angeles 37) to send me their sample lesson. I examined it carefully, and based on their sample lesson their course is an excellent one—and if Cummins Diesel approves it, that's good enough for me.

It might be worth sending for the sample lesson if you're already in the field and haven't been advancing too rapidly, or especially if you haven't decided exactly how you're going to make your living. Might as well do the thing you like well. You'll be happier, always be in demand, and you'll command a better salary. Think it over.

WAGON EXTENSION

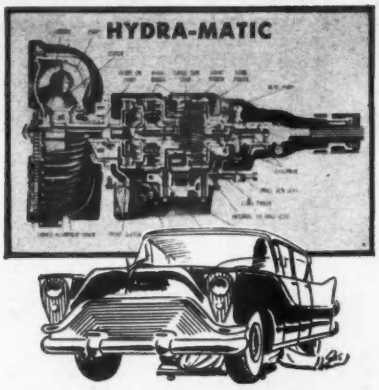
If you own a '57-'59 Chrysler wagon, and could use a lockable extra compartment, you'll

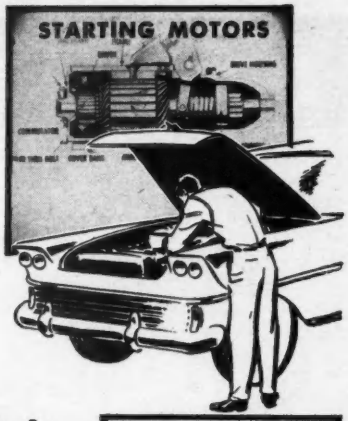


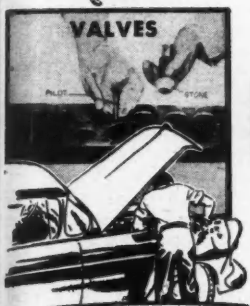
be interested to learn that one may be going into production. This 35-lb., 23-cu.-ft. trunk hooks onto the tailgate, and is ideal for camping equipment. On special order it could be made for $200; full-scale production will lower this to $125. If you're interested in the Traveler, contact: Vince Gardner, 24001 Lahser Rd., Detroit, Mich.

GOGGLES WITH INTERCHANGEABLE LENSES

I don't wear glasses but there are a host of race car drivers and motorcyclists who do. It's easy to appreciate their problems regarding eye protection. I've seen a variety of face shields that do a good job, but there are certain conditions like dust where better sealing around the eyes is required. Webco, Inc., 218 Main St., Venice, Calif., is marketing an imported goggle called Neoplex, that offers full vision through interchangeable clear, amber, or dark green shatterless one-piece lenses. Soft foam rubber makes a good seal around the irregular contours of the face and forehead, and slots are molded in to pass the side bars of everything from heavy tortoise frames to thin metal ones commonly used on eyeglasses. For real comfort and good visibility, try these for $3.95 (includes all three lenses) if you ride a cycle or drive competition cars.







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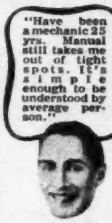

—V. Lauria, Nev.

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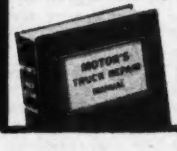

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Use Tests OF NEW PRODUCTS

EXPERIMENTAL BRAKE MATERIAL BURSTS INTO FLAME ON FRICTION TEST MACHINE. LININGS MUST WITHSTAND OVER 500°F HEAT.

Eight Raybestos linings make each installation "custom"

THE STOPPING ABILITY of an automobile depends on the quality and endurance of its brake lining. Weight distribution, pitch and tire condition are big factors that influence stopping distance, but no known brake lining can compensate for the attitude of the vehicle or its tire adhesion when the brakes are applied.

Lining manufacturers are constantly researching to meet the demands of auto makers who seem to insist that the friction material has more to do with good braking than area or drum cooling. Just about the time a new lining has been perfected to work consistently within the rather narrow confines of the auto builders' specifications, further demands, such as increased weight and smaller wheels, are made upon the lining material.

Raybestos, no stranger to brake lining materials, have been able to cope with the increasing demands of stopping today's cars, and in many cases have improved on the specifications of the auto maker.

A study of the braking systems in common use reveals a great difference in the amount of work the lining is called upon to do, even on the same wheel. Most cars employ the Bendix system, or a modified version of it, where the front and rear shoes are connected at the heel or bottom by a spring. When the brake is applied with the car in forward motion, the wheel cylinder actuates one shoe (primary); this shoe actuates the secondary shoe onto the drum but due to the linkage with the servo action of the primary, the secondary shoe does almost twice as much work. This means that it applies more pressure, gets hotter, wears faster.

It is pretty obvious that the secondary shoes have different requirements from the primary and this is the theme of Raybestos development: a lining material to meet the demands of each shoe within a single brake assembly. Consequently, a low friction material is provided for the secondary shoe, because of its high pressure operation, and a high friction lining is used on the primary shoe so that it does more of its share of the stopping—despite the rather low pressure it is applying to the drum. Within such a system there are variables according to the weight of the vehicle, drum diameter, cylinder pressures, etc. For this reason, Raybestos has eight different types of linings in two quality grades to accommodate the demands of just about every domestic car, and some imported models using the Bendix-type brake.

Centerplane brakes, sometimes called two leading shoe and/or total contact brakes, employ a separate wheel cylinder for each shoe. Both of the linings on each wheel do an equal share of stopping work and therefore demand the same coefficient of friction of a medium-low or medium friction material. Again, Raybestos has, by actual test, calibrated the type of material, not only for this braking system, but for the particular make and model of car.

Although MOTOR TREND has been running several sets of Raybestos brake lining on staff cars with excellent results, the real information on the manufacturer's product was gleaned from observing the rapid wear tests conducted on their fleet of 20 test cars. Laboratory tests during the development of a lining material can tell many things. There are huge machines to check the abrasive qualities, coefficient of friction, hardness and actual wear, but the factual conclusions are reached when linings are put on cars and driven.

MOTOR TREND'S testing staff endeavors to select products of interest to readers and to analyze them under conditions of actual use—just as any average consumer might like to test them before purchase. The purpose is to evaluate the product objectively in terms of the manufacturer's claims for it, and to pass on our test findings as a service to readers in trying to help them determine the merit of respective automotive items for their own particular use.

To qualify for a MOTOR TREND Use Test a manufacturer must first present his request for a test in writing to Testing Staff, MOTOR TREND, 5959 Hollywood Blvd., Los Angeles 28, Calif. In addition, before any item is accepted for testing, the manufacturer must sign a release agreeing to MOTOR TREND'S printing the complete, impartial test findings—whether the product be approved or disapproved. Only those products whose makers agree to these terms will be tested, and only those which are proved by actual use test to meet the manufacturer's advertised claims will be awarded the MOTOR TREND Seal of Approval, which may be displayed in advertisements of that particular product.

The cockpit of these brake-testing cars are so full of meters, gauges and thermometers that there is hardly room for the driver. Heart of the whole system is right under that brake pedal: a hydraulic system that not only measures the pedal pressure required, but the distance that it must move to determine what is happening inside the brake drums. To maintain a constant stopping rate there is a decelerometer, or "G" meter, and a tiny thermocouple imbedded in each lining to record its temperature on a dash-mounted thermometer. All of the brake systems on the test cars are standard but without power, vacuum or servo assists of any kind, as the pedal pressure and distance testing devices do not work accurately with these assists.

One of the first operations after installation of new linings, and a good procedure for anyone with new linings to follow, is the burnish treatment or car cure. New or "green" linings are not as heat resistant as older ones and they contain a small amount of lubricant that cooks out and shortens lining life if the brand-new set of shoes is abused. Raybestos performs a series of low-speed stops from 40 mph, allowing plenty of cool-off interval between the stops. As this is not practical for the average motorist, the same "car cure" can be effected by avoiding long, hard stops for the first 200 miles on new linings. In an emergency, remember, a series of short, hard pumps on the pedal is easier on the brakes than one long, hard one.

To give a little idea of what the brakes on your car must endure and still survive, let's take a look at the temperatures involved. Raybestos brake-fade tests consist of a series of high-speed stops at rapid intervals with little time for the brake assembly to cool off. During these tests, drum temperatures flash as high as 1100°F with linings that are designed to stabilize (and do) at slightly over 500°F.

The pedal pressure and stroke calibrations and the "G" meter in the test cars now begin to tell their story. Once a full fade condition has been developed, it is necessary to determine recovery time. Stopping rate and distance, coupled with the amount of pedal pressure and travel, measure the length of time required for the linings to recover their strength sufficiently to produce a normal stop with normal foot pressure. The test brakes are now dismantled, inspected and measured for wear and reassembled to begin several months of driving to check actual long wearing qualities under all weather conditions.

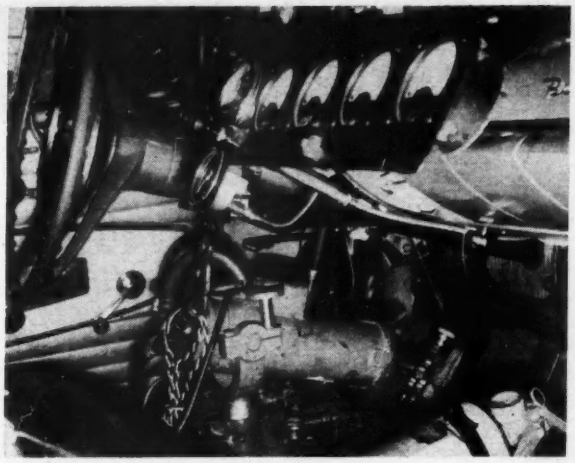
During this schedule, the test driver will make at least 3000 stops, divided into sections of 40 to 0 mph, 50 to 0 mph and 60 to 0 mph. By the time this series is completed, the linings have been exposed to as severe punishment as they are ever likely to get under hard passenger car driving. One important thing to remember is that every part of the braking system of the test fleet is maintained in perfect condition. This need not sound ominous or expensive but it is required to insure perfect operation of your brakes, regardless of what lining you choose. *There is no such thing as a good cheap reline job.*

Linings do not vary much in cost but the quality of the labor and knowledge of the mechanic do, and it is worth it to know that everything in your braking system is doing its job well to make the most of new linings. Master and wheel cylinders must be in good working order. Drums must be ground (even new ones have several thousandths of an inch run-out), and the new linings must be arced to the radius to match the drum. Shoe mounting, spring tension and alignment must all be to specification to get the most from brake linings.

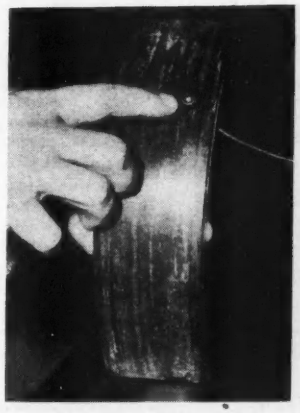
MOTOR TREND discussed the problem of wet brakes with Ron Maolli, chief engineer of Raybestos brake lining development. He says that it is comparatively easy to make a good lining that will not soak up moisture, but it is almost impossible to get it to work with a brake drum that has a layer of water spinning around inside it. Ordinary dampness of rain or snow that is absorbed by the lining is quickly driven out by the first easy application of the brakes, but for those deep puddles that actually invade the drum and stay there, apply the brakes and throttle at the same time to drive out the water. The linings will then be able to use their high coefficient of friction against the drum and not against a layer of lubricating water.

Raybestos riveted linings are pre-formed for riveting to your old shoes, but the bonded linings are furnished on the shoe and are available on an exchange basis. Whichever you require, make sure the brake mechanic arcs them to a freshly ground drum before they are installed.

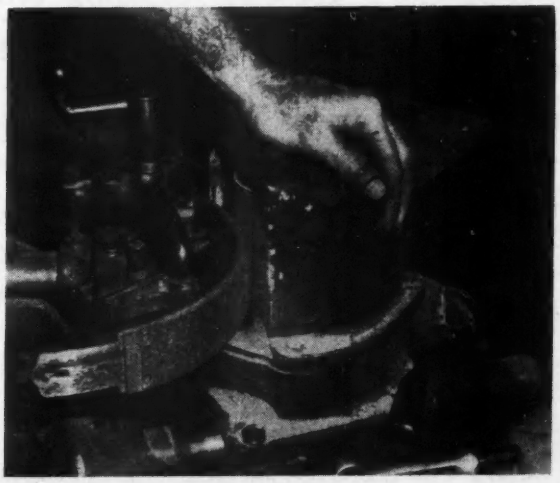
From the rigid tests and production control observed, and the excellent results obtained in our test cars, MOTOR TREND awards the Seal of Approval to Raybestos brake linings.



Test cars are loaded with equipment to measure and control braking. Large cylinder attached to pedal measures pressure, stroke. Dash-mounted dials are lining and drum thermometers.



Tiny thermocouple (left) imbedded in lining is wired to dash-mounted thermometers to indicate lining temperatures. Brake drums (right) must be measured and ground to a true circle to insure uniform braking and the best performance from linings.



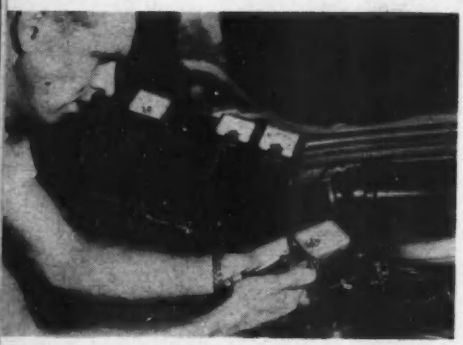
Good brakes depend on proper installation and the experienced mechanic will make sure that there is uniform contact between drum and lining by arcing the new shoes to the same radius as the drums. Even new drums should be checked and ground true.

Use Tests OF NEW PRODUCTS

continued

Kal-Equip instruments are accurate for fine tuning

THE SENSITIVE EAR and delicate touch of the shade-tree mechanic is slowly losing out to electronic instruments that can quickly and accurately detect automotive timing and ignition problems. These same instruments are just as important a tool to proper tuning as the wrenches and screwdrivers that make the adjustments indicated by their electronic analysis.



In the hands of a real expert, electronics can probe out such things as worn cam and distributor lobes, faulty timing gears, and uneven cylinder combustion. Electronic analyzers are no longer a gimmick, but a real necessity in any modern garage. Speed tuners have long relied on such equipment for getting the ultimate in engine performance, and the family car's efficiency is just as important.

Realizing the need for extremely portable electronic testing tools, the Kal-Equip Co., of Otsego, Mich., has put together a kit of instruments, packaged in a heavy-duty steel case, at a price that is not only attractive to the professional mechanic, but well within the reach of sport, hot rod and race car owners.

Housed in a steel box 7½ by 10½ by 14 ins. are an Ignition Dwell Tester, Tachometer, Regulator Tester, Output Meter and a Kal-Lite. Each instrument has pistol grip, fingertip or thumb control, is chromeplated and has rubber-covered folding hooks on the back for hanging near the engine if desired.

The Dwell Tester, calibrated in degrees for four-, six- and eight-cylinder engines, measures the length of time the distributor contacts are open and closed with the engine running. It has a single thumb-operated calibrating knob for number of cylinders.

The electric Tachometer for checking idle variations, automatic transmission slippage and detecting weak cylinders has a dual scale reading 0-1000 rpms in the low range and 0-5000 rpms in the high range. A separate switch converts from six- to eight-cylinder readings and four-cylinder speeds are determined by double readings on the eight-cylinder scale. This instrument operates from the primary circuit of any six- or 12-volt battery ignition system, but an alternate is offered in the model T-102 for measuring two- or four-cycle engines with magnetos.

The detection of three-unit voltage regulator troubles are simplified with the Kal-Equip Regulator Tester. Generator and regulator voltage and amperage readings are obtained by a three-way selector switch, with a separate control for negative or positive ground. For checking and correcting the entire ignition system up to the spark plugs, the Ignition Tester measures high voltage and high amperage output on six- and 12-volt battery ignition systems. An alternate instrument, model T-162, is offered for checking magneto systems.

The Kal-Lite is a well-made timing light for setting ignition advance while the engine is running by the use of timing marks on the flywheel or crank pulley. The instruments are available separately, but the complete kit sells for $187.50 and is available through large equipment suppliers or direct from the manufacturer. The instruments are extremely well made and are easy to use, even in the hands of a novice.

We take pleasure in awarding this kit the MOTOR TREND Seal of Approval.

Autopulse pump ends fuel starvation, adds speed

WHY AN ELECTRIC FUEL PUMP? Doesn't my mechanical pump give me enough fuel pressure?"

Yes, it does—if you own a perfectly stock, mildly tuned conventional sedan. You don't need an electric pump; it might be nice to have, since it eliminates vapor lock, but you really don't *need* it. On the other hand, if you control a horsepower machine, a brute, the only way you'll get enough fuel to the combustion chambers is with an electric pump.

Here's why: If you place a bucket under a great big hose with only one pound-per-square-inch pressure, the bucket will fill rapidly. Yet, if you use a tiny hose with a full 100 psi, it takes time to fill the bucket. Pressure does not equal volume; your engine operates off fuel *volume* rather than fuel pressure.

MOTOR TREND'S test car was a 1958 Austin-Healey Sprite, modified to accommodate MG carburetors. Induction and exhaust system had been opened up and polished, combustion chamber reworked, and rotating assembly balanced for high rpm. Equipped with mechanical fuel pump, the engine lost its punch at about 5500 rpm, when the small low-geared car was just starting to move.

An Autopulse 12-volt fuel pump, supplied by Electric Autopulse Div., Walbro Corp., Cass City, Mich., was installed on the firewall as a replacement for the stock pump. It was mounted low, since electric pumps are not self-priming and push the fuel a lot harder than they pull it.

Now, in the lower gears the Sprite runs up to 7500 rpm with the stock cam, and the flat spot on the tach at around 6000 rpm has practically disappeared. Since the installation, gas mileage has dropped from 33 mpg to 26 mpg, indicating that a lot more fuel is getting to the engine and a lot more performance is coming out, too. It is noticeable on the road. This was the idea behind this installation; normally, a fuel pump has no effect whatsoever on fuel consumption. Repeat—no effect whatsoever. This was a particularly rewarding installation, where the engine had been starving out at high rpm.

The stock fuel pump, like all others, was responsive to pressure rather than volume. A cam lobe pushes against the pump arm, which pushes against the diaphragm. This motion sucks fuel into the pump chamber, and compresses a coil spring, normally set at about 5-7 psi, against the diaphragm. This spring exerts a steady push against the fuel, urging it toward the carburetors. As the fuel is pushed through the lines, pressure drops and the pump arm compresses the spring again as it pulls in fresh fuel.

But at high speed, the pump arm tries to work too fast, and as a result doesn't work at all. As engine speed drops through lack of fuel, the pump picks up again. Thus, the benefit of an electric pump is that it works independently of engine rpm.

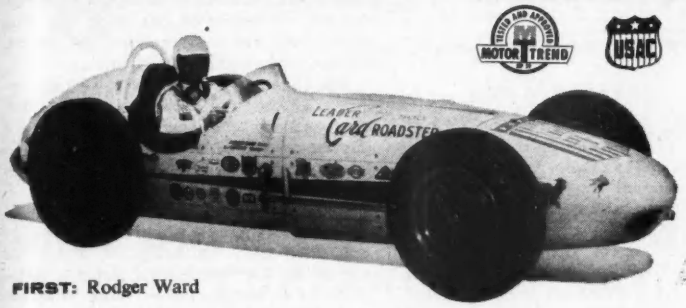
On our test installation, the Autopulse electric fuel pump, priced at $18.50, improved top-end performance, and its advertising claims are well within its capabilities. We take pleasure in awarding it our MOTOR TREND Seal of Approval.

continued on page 66

THE INDIANAPOLIS "500" PROVES IT AGAIN! TO PLAY SAFE YOU SHOULD

INSIST

ON RAYBESTOS BRAKE LINING



FIRST: Rodger Ward

SECOND: Jim Rathmann

THIRD: Johnny Thomson

In the brake-torturing "500", those who finished 1,2,3 in 1957 . . . 1958 . . . and once again in 1959 . . . relied on Raybestos Brake Lining. Rodger Ward, Jim Rathmann and Johnny Thomson know that at 170 mph when you're faced with the need to speed deep into the turns and use your brakes, they must respond perfectly. The same reliable braking action is vital in suddenly erupting traffic jams and critical pit stops. That's why they insist on Raybestos Brake Lining. And so should you. Raybestos' performance at Indianapolis—the world's most grueling proving ground—is proof positive that these linings will give you the *extra* margin of safety that could save you serious injury . . . or even death.

If you would like to enjoy your own set of three 8 x 10 photos of Rodger Ward, Jim Rathmann and Johnny Thomson, just send $1.00 (to cover handling and postage) with your name and address to Raybestos.

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RAYBESTOS-MANHATTAN, INC., Brake Linings • Brake Blocks • Brake Fluid • Clutch Facings • Industrial Rubber • Mechanical Packings • Asbestos Textiles Engineered Plastics • Sintered Metal Products • Rubber Covered Equipment • Laundry Pads and Covers • Abrasive and Diamond Wheels • Industrial Adhesives • Bowling Balls

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AUTO SAF-TEE BELT

THE ORIGINAL AUTOMOBILE SAFETY BELT

This handsome model is by far the most popular safety belt available to the motoring public—designed specifically for new model interiors—available in TEN HARMONIZING COLORS—black, blue, grey, green, maroon, white, tan, turquoise, black & white combination, flame red—designed to compliment the modern driver. The brilliant chrome plated buckle assembly exceeds minimum safety requirements by over 1000 pounds. Incorporates the original FLOATING CAM DESIGN which allows the cover to lie flat when in use—No chance of accidental release—complete with all necessary hardware for installation in any vehicle.

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Calif. Residents add 4% sales tax.

Use Tests of New Products

Kendall research helps reduce combustion deposits

IN THE DAYS of the Model T Ford, the only function of oil was to lubricate, and the low-speed, low-powered engines made the job not too hard to do. The compression ratio of the T, incidentally, was 3.6:1.

But, even then as now, drivers wanted more power from their engines. Manufacturers started rotating them faster and compression ratios climbed steadily. Today, 10.5:1 is commonplace; 12:1 engines are already built; and according to the men who know about such things, ratios of 17:1 are absolutely feasible.

Gasoline refiners are doing a wonderful job providing the octanes these high-compression engines demand, and lubricating oil producers have shouldered a far heavier burden. In addition to producing a good lubricant, their oil must perform other functions.

A modern motor oil can almost be described as merely a vehicle to convey specific additives to where each does its specific job. Detergents pick up engine deposits and dispersants keep them in solution until the oil is drained. EP (extreme pressure) additives keep pistons and camshafts from scuffing and galling. Oxidation inhibitors keep the oil from breaking down under engine heat, and foam inhibitors make sure that oil, not air, flows through the oil pump.

There are many others. Viscosity stabilizers (these keep chilled oil from thickening, heated oil from thinning) have made multiple-viscosity oils like 10-30 possible, but it hasn't been easy for the refiner. Sometimes an additive that cures one problem creates others that are even worse; occasionally an additive will perform more than one function. An example is the viscosity stabilizer additive, which also seems to convert combustion chamber deposits from a hard carbon to a soft carbon that is blown out the tailpipe.

The only way an oil refiner can keep abreast of engine and fuel developments is by constant research. All of the major oil companies allocate a substantial portion of their budget to this end. Much of the information gathered independently is shared through the medium of technical papers presented to the Society of Automotive Engineers (SAE), world-recognized authority.

One such paper was presented by R. L. Overcash, W. Hart and D. J. McClure of Kendall Refining Co., Bradford, Pa. Titled "Crankcase Oil—An approach to the combustion chamber deposit problem," it outlines a year's research to develop a motor oil that not only lubricated, but at the same time helped keep the engines free from deposit buildup in the combustion chambers.

Test engines were run under different conditions of load, lubricated by oils from different base stocks and refining cuts. Fuel was a mixture of readily available gasoline. After laboratory findings were evaluated, they were retested in actual road application.

It was determined that certain crude stock, refining processes and additives combined to produce a good lubricating oil that would also reduce the formation of deposits in the combustion chamber. This raises the mechanical octane (makes the engine less sensitive to fuel anti-knock qualities). It means that a medium-high compression engine can operate without pre-ignition ping on less than super fuel; and, an extremely high-compression engine can operate on fuels presently available.

On the basis of Kendall's continuous research, and our satisfaction with the results of their oil in our test cars, MOTOR TREND is pleased to award the Seal of Approval to Kendall Refining Co.

Brisko regulator controls fuel pressure and volume

WE SOMETIMES THINK that a lot of motorists have no conception of how a fuel pump and a carburetor check valve work. Regardless of whether the fuel is pumped mechanically or electrically, in normal application a well-seated shut-off valve is insensitive to the fuel pressure as long as it is within reasonable bounds. The fuel supply system works on volume. As the carburetor's fuel chamber empties, the float drops, opening the valve. As fresh fuel enters and the fuel level then rises, the needle valve is pushed against its seat, shutting off the fuel. The principle is exactly the same as that of the water reservoir in a toilet.

If the seat or the needle valve is worn, fuel will continue to flow through the closed valve, flooding over onto the carbs. There is no substitute for a properly operating shut-off valve.

Under hard cornering or conditions of inordinately high fuel pressure, flooding that normally would not occur takes place, even with a good check valve. A regulator, under these conditions, does lower and stabilize the fuel pressure under which the check valve must close, without decreasing the flow volume.

With multiple carburetion, a regulator is a *must*, since the fuel is pushed through different lengths of hose. The longer the line, the more the pressure drops off. Thus, the carburetor farthest away from the pump will have the least pressure, and you may find that half of your engine is literally starving to death at high rpm.

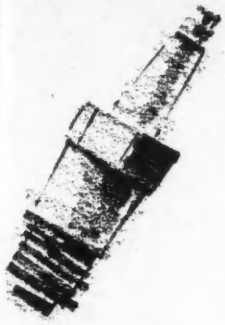
MOTOR TREND installed a Brisko Regulator on the carburetor side of an electric fuel pump that was itself installed on a '58 Austin-Healey Sprite. The electric pump had done a marvelous job, there was plenty of fuel coming to the carbusetors at any rpm, but under hard cornering and pitch the check valves of the twin SUs would not close properly. Fuel flooded over the carburetors, not only wasting fuel but creating also a genuine fire hazard.

The Brisko Regulator has a pressure-sensitive on-off valve built into it, supplementing the ones located in the carburetors. As a surge of fuel enters the regulator, it pushes upward on a diaphragm, which is attached to an arm. As the arm goes up, it seats a ball, closing off the incoming fuel until engine consumes enough to again lower the pressure. Then, another surge hits the regulator for the second cycle. Meanwhile, a filter catches filterable matter, and a magnet snares and holds ferrous particles.

In our test application, a pressure gauge connected to the regulator indicated a *constant* three psi. Further, hard cornering proved that the car had to be leaning on its side to make the carburetor reservoirs overflow.

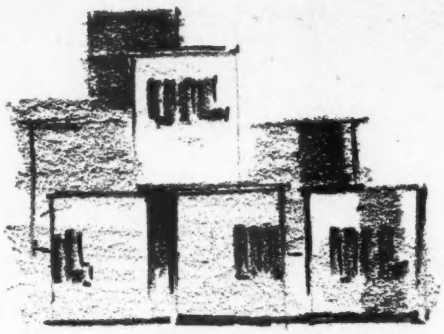
This is an interesting point—Brisko himself is an old Indy race driver. He knows engines, and he sells a regulator that regulates. He does not promise unproduceable miracles.

On the basis of our testing, we are happy to award the Brisko Fuel Pressure Regulator, (manufactured by Brisko's Mileage-Saver, Inc., Box 106, Exeland, Wis.), priced at approximately $6, the MOTOR TREND Seal of Approval.



DOUBLE SPARK PLUG LIFE

Your spark plugs will last longer! Believe your own eyes—see how your plugs look after 20,000 or 30,000 miles. Normally oil filth fouls spark plugs. Magna-Power reduces filth, helps the plugs—gives your engine added pep and power.



6,000 MILE OIL CHANGE

Your oil will stay cleaner—last longer. Filters too! Magna-Power destroys the powerful chemicals that cause oil break-down—lets you SAFELY drive 4,000—even 6,000 miles between changes. You can rely on the exclusive chemical action of Magna-Power! It slows oil break-down.

DOUBLE ENGINE LIFE

Your engine will stay like new!—many thousands of extra, carefree, and powerful miles. Magna-Power stops corrosive acids—the major cause of wear. You can have a "new and tight" engine for years and years with Magna-Power.

ONLY ONE PRODUCT OFFERS ALL CAR OWNERS AN ABSOLUTE GUARANTEE OF SAVINGS—MAGNA-POWER!

KEEPS ANY ENGINE NEWER, LONGER

By Stopping Acid Damage Where It Starts, Magna-Power Stops Major Cause of Engine Wear

Of all the reasons why car engines wear out, acid damage has been proved to be the most important. It affects every gasoline burning engine in every car today, from the most expensive limousines to the lowest-priced economy cars. Why?

No engine—*without protection*—can escape the damage that is caused by gasoline-produced acids that attack the metal surfaces of your car's engine. That's because acid—sulfuric acid—is formed by gasoline "blow-by" vapors that mix with water moisture in your car's crankcase, whenever your engine is running. It forms so easily and quickly that several pints of this acid are washed through your car's engine lubricating system in a normal year of driving. Additional acid fumes are blown out through your car's muffler system as part of the exhaust.

You don't see this acid, of course. But you can measure it by chemical process. You can even smell it in the characteristic sharp odor of the exhaust from your car's muffler system. (How many acid-eaten mufflers have *you* had to replace in your late-model car?)

Acid damages more than just your car's muffler system. It eats away at the close original "tolerances" between metal surfaces inside your engine that are lubricated by crankcase oil, it contributes to the formation of heavy sludge and varnish deposits within your oil, and it shows up—sometimes sooner, sometimes later—in engine repair bills that grow costlier and more frequent as your car grows older. But—it never needs to happen!

MAGNA-POWER STOPS ACID DAMAGE

You can protect your car's engine (and reduce its upkeep cost) with a misleadingly simple product that has now been on the market for several years, tested and approved by thousands of enthusiastic car owners. It is a safe, sure, inexpensive device that is simple to install. (You can do it yourself in a minute or less at your next oil change.) This device is the unique and fully-guaranteed "Magna-Power" drain plug that is available for almost every make of car in the world.

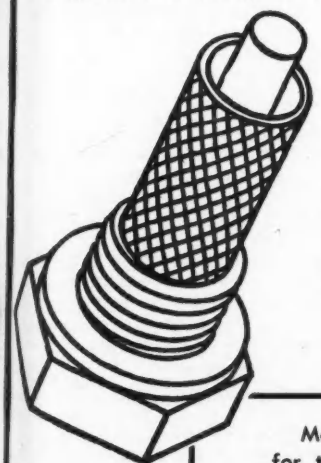
HOW MAGNA-POWER WORKS IN ENGINES

Magna-Power is simply a crankcase drain plug that is built to replace the one now on your car—but with a difference! The difference is in the addition of a special metal alloy that is part of every Magna-Power plug. It rises above the level of the drain opening within the crankcase itself, in the shape of a cylinder, so that the special metal alloy comes into direct contact with the circulating flow of crankcase oil. It attracts—and neutralizes by its chemical reaction—the acids present in your crankcase oil and renders them harmless to do further damage. It's just that simple and just that effective! It works because the acids destroy themselves in attacking the special metal alloy of the Magna-Power plug (which has to be replaced, eventually) instead of attacking metal surfaces within your engine as they normally do.

Because of Magna-Power's well-proved method of protection against acid damage to engines, similar products that you may have read about have been offered to car owners in recent years. Of all such products, however, only Magna-Power has withstood the test of consumer trial and acceptance for so many years and by so many thousands of car owners. And *only* Magna-Power offers you the ultimate in product guarantees: You buy Magna-Power at no risk to yourself—you prove it to your own satisfaction in actual results—or you can return it at any time, for any reason, for a full and immediate refund. We can take this risk because we have found from experience that Magna-Power delivers all we say it will, and more!

PROTECT YOUR CAR NOW

You have a sizable investment in your car. Give your engine this safe, sure, vital protection that has actually doubled engine life in the experience of many thousands of Magna-Power users. Give yourself the fun and thrill of driving a car that keeps its full power and performance for as long as you want.



FREE 30 DAY TRIAL

Magnetic plugs also available for transmissions and differentials. Ask for free information.

MAIL COUPON NOW FOR 30-DAY FREE TRIAL

(Use Margin If Needed)

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Magna-Power, with a powerful Alnico magnet attached, pulls iron and steel abrasives right out of the oil pan—gives your engine added protection.

My car is a_____(make)_____(year)

$4.95 PAT. APP. FOR

Send me a Magna-Power for my car on your 30-day FREE TRIAL. If I like Magna-Power, I will promptly send $4.95 (plus 25c postage and handling). Otherwise I will return Magna-Power and owe you nothing!

SAVE—Send $4.95 with order and we pay postage—handling—Money back guarantee.

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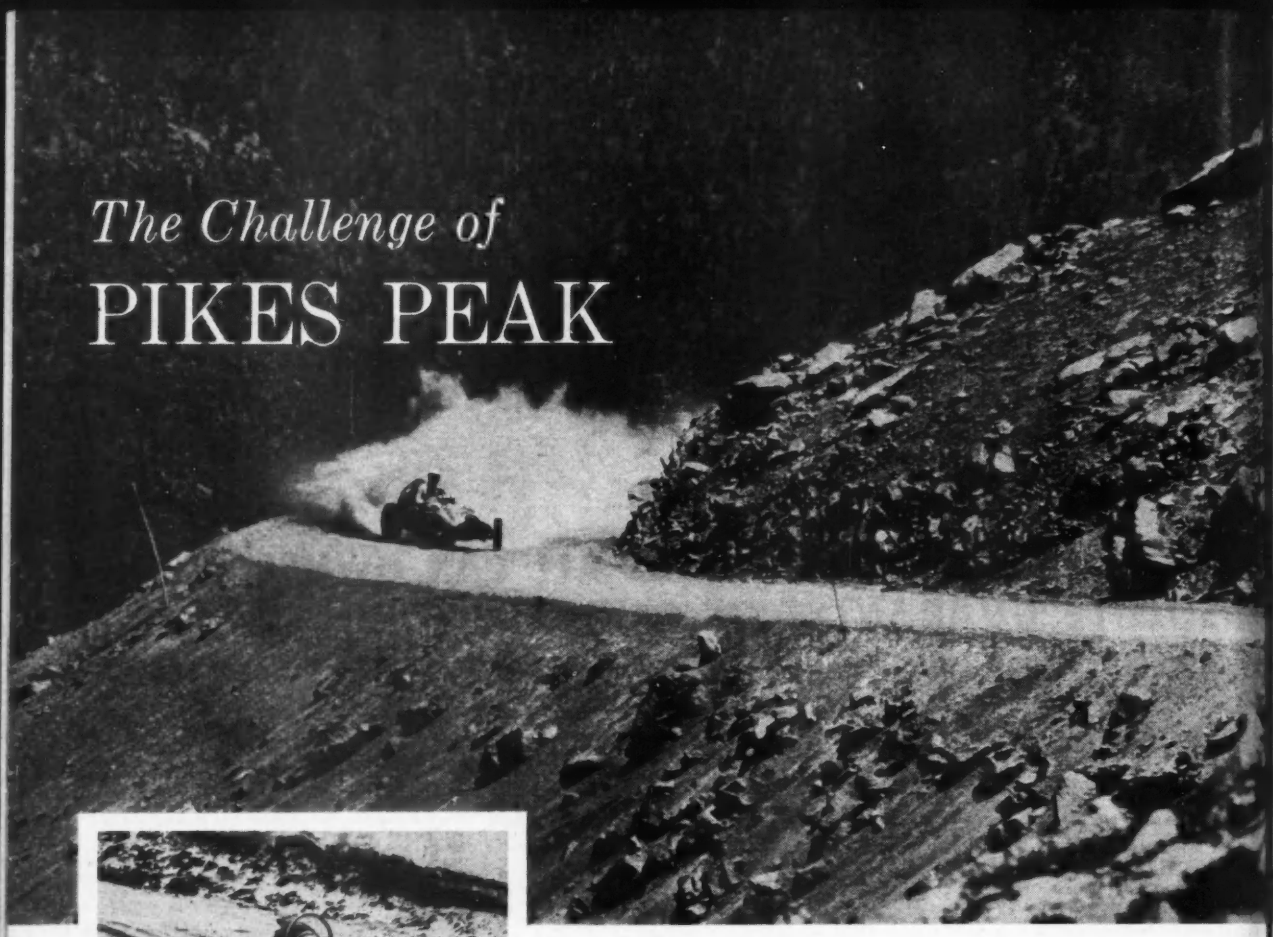
The Challenge of PIKES PEAK



THE PIKES PEAK AUTO HILL CLIMB is one of the best known, least understood events in American automobile racing. This is especially curious in view of the fact that this year's July 4th and 5th meet was the 37th to be run up the Big Hill. Sponsored by the Pikes Peak Auto Hill Climb Association Inc., the climb is many things, all of which make it a paradox in auto racing. It is dangerous yet safe; fast but slow; the weather may vary from sunny and warm at the bottom to a raging blizzard at the finish; and it requires specialized mechanical techniques, though in the stock car class the cars have very few modifications. Most important of all, from the competitors' point of view, the cash payoff is the largest in racing for the distance traveled.

The public toll road used as a race course, loosely surfaced with dirty brown decomposed granite, curves its way through some of the most spectacular scenery on the face of the earth—but drivers have little time for sightseeing. From the starting line—at what is called 8½-mile post and is at 9402 feet elevation—the cars wind their way at three-minute intervals up the hill for nearly 12½ miles until they reach the summit, 14,110 feet above sea level. Here engines and drivers alike are starved for oxygen. Tourists are warned to walk at half speed and at that, some can't take the altitude.

Imagine, if you can, driving this hill at an average speed of nearly 60 mph, up grades of 10 per cent much of the way, slowing to 20 mph for some of the reverse switchbacks, many of them a narrow 20 feet of road surface. Add to this the constant hazard of weather which can and does change without warning. This year, for example, the race was begun under a brilliant sun with balmy temperatures all the way to the top. Within 15 minutes the sky was dark with threatening cumulus clouds which immediately let loose a barrage of soft hail-like pellets until the road was white and slippery. Our vantage point at the 16-mile post, which had offered unobscured visibility to the start below, was completely weathered in. I would have hated to attempt a drive up or down. It was virtually impossible to face the wind-driven, needle-like icy projectiles. But after a few seconds, the roar of an approaching Championship car broke through the noise of the storm. The driver's speed was slowed considerably but he was still

Racing is spectacular on Pikes Peak where conditions may vary from dust dry to blinding snowstorm during climb to the top. Louis Unser's grimy face shows results of mud and snow after spinning his Championship car. Tiny Abarth Fiat coupe, bottom, points up variety of sportscars entered. Smaller-engined cars find running difficult near top of 14,000-foot peak.

Story by Wayne Thoms, Photos by Bob D'Olivo

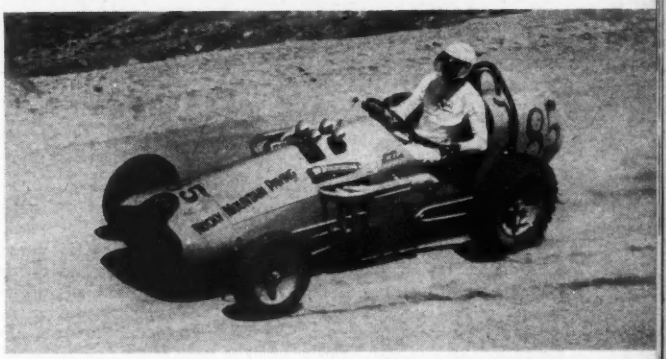
ONE OF THE MOST SHATTERING sights in racing is the first view of a Championship-type race car making its twisting way up Pikes Peak. From far above the spectator can see the single-seat machine race up one of the short straights, brake and throw the car into a wild broadslide around a hairpin. The first-time watcher catches his breath, feels his heart pound and is convinced that the driver is going to dump the car over the side and into several hundred feet of space. Then comes the next car. Quickly it becomes apparent that this is the way it is done on the Peak.

These Championship cars are not as raced on the regular circuit. They are built especially for the Pikes Peak event and are usually a melange of modified passenger car parts, solid front axles from Ford, high ungainly bodies, ultra-lightweight chassis and a startling array of engines. This year's entry list included Meyer and Drake Offenhausers, a Lincoln, Cadillac, Chryslers, Chevys, DeSoto and an elderly flathead Ford V8. The winning car, driven to a new record of 13:36.5 by Bobby Unser, was powered by a modified Pontiac engine, using a Racer Brown camshaft.

Strangely, very few are supercharged. The logical assumption that forced induction would be ideal in this high altitude is not the case. The men with experience know they have enough power; what they want is traction. And they get it with Firestone's Town and Country tires, designed for mud use on passenger cars but readily adaptable to this unique race course.

In this year's event, the top three place cars, Unser, Slim Roberts and Charley Lowderman, each broke the old record of 13:47.9, set last year by Unser in a Jaguar-powered Special. It was unfortunate that a sudden hail, wind and snowstorm handicapped a number of highly-favored later starters, but with the variable weather on the Peak it's every man for himself.

Winner Bobby Unser drives his Pontiac-powered Championship car to win class and set new record for 2nd year in a row. Unser family, brothers and uncle, have nearly dominated Peak event in past years.



Slim Roberts, whose Lincoln-engined car had top qualifying time, broke last year's record but finished 2nd in climb because he "tried too hard." It was the 3rd time he had ended in 2nd spot.

going, straining to see ahead and trying unsuccessfully to protect his face from the vicious slashing it was receiving.

Fortunately, such storms usually don't last long. This one was over in 20 minutes. During qualifications, held earlier in the week on an abbreviated version of the course, another and more common hazard presented itself—fog. At this altitude clouds regularly wrap the hill in their misty vapors. This is when it pays to know the hill—or go mighty slowly.

Although the impression gathered from looking at photos of race cars sliding through turns—rear wheels trailing a rooster-tail of gravel high in the air, front wheels in the traditional "crossed-up" position—is that this is a race run at high speeds over roads where one mistake means a sheer drop down the face of a cliff, this just isn't true. Without detracting one bit from the skill required to drive the hill, the road is so arranged that there are relatively few spots where it is possible to slide over an edge. In the spots where it can happen, the drivers give the edge a healthy margin of safety. Again, not to detract from the excitement generated when a car comes sliding around a particularly tight hairpin, speeds at these points are not high. There are spots on the course where the pure racing cars may approach 100 mph but the really spectacular slides are made dirt-track style at much lower speeds. Of course, drivers do spin out and go off the road and there have been injuries. However, there has never been a fatal accident in the 37 times this event has been run. This safety record speaks for itself.

Many of the drivers who run the Peak are local men, semi-pros who may drive only this one event each year. Why? First of all, it is not tremendously expensive to build or prepare a car for the Peak. Second, the winner in the Championship division this year (Bobby Unser) took home $5250 which is good pay for a 12½-mile ride that took just over 13½ minutes. (Unser, of course, is a full-time pro.) While the money paid for the first five positions of stock and sportscars is not quite as good, it is well worth the effort, and a skillful chauffeur has an excellent chance of paying for his Colorado vacation.

Does Pikes Peak really prove anything or is it just another auto race? The Ford Motor Co. and General Motors must believe that climbing the Peak is significant. They each maintain engineering facilities near the bottom and regularly test new models up the hill under conditions which their elaborate factory test tracks cannot possibly duplicate.

Aside from what it proves, the drivers enjoy the ride. There is probably something akin to the philosophy of the mountain climber who, when asked why he had to scale a difficult peak, answered, "Because it is there."

Magnificent panorama of 12½-mile-long, switchback-crowded race course provides thrilling viewing for spectators who find vantage point near top. Road appears dangerous but there are few spots where cars can slide over edge and drivers give these an extremely wide margin.

The Challenge of PIKES PEAK

Ak Miller repeated his last year's win in the unlimited sportscar class with spectacular driving despite overheating engine.

SPORTSCARS HAD THEIR DAY (July 5th) at Pikes Peak this year. Taken as an entity, the show was disappointing and the entry list (22 cars) small. Considering other factors, the event was not as weak as it seems and there is hope for next year if a few more sportscar enthusiasts will plan ahead and enter. The reason for planning well in advance is simply this: Because practice and qualification periods are held from 5 to 8 A.M. during the two weeks preceding the event, it is necessary for most entrants to schedule their vacations to make the program. The early hour is used because the road is turned back over to the tourists for the rest of the day.

International Hillclimb championship points were awarded by the F.I.A. for the under 1500cc class, and top contender appeared to be Robert Donner driving his Porsche RSK Spyder. A spinout put him out of the money and the first three cars in class were Rolf Docterman (Alfa Romeo Veloce) 18:16, Meredith Williams (Alfa Veloce) 18:46, and Jack Vaeth (MG-A) 20:28.9. These times and winning cars should give Porsche and Lotus owners all sorts of ideas for next year. Finish order in the 1501-3000cc class gave first place to John Rostek (Mercedes 300-SL) 16:27.3, Jim Orr (A.C.-Bristol) 17:27.1, and Ed Colt (A.C.-Bristol) 17:36.9.

It was the unlimited sportscar class that made the event exciting. Ak Miller, who pocketed nearly $1500 for being first in his Miller-Hanson Special, made the top in 15:39.3 despite a badly overheating engine. Next was Danny Jones (Kurtis 500-Cadillac) 15:52, and Bob Carnes in a new Corvette-powered Bocar XP-6 at 15:57.4. Balance of the field consisted of Corvettes and a lone Thunderbird.

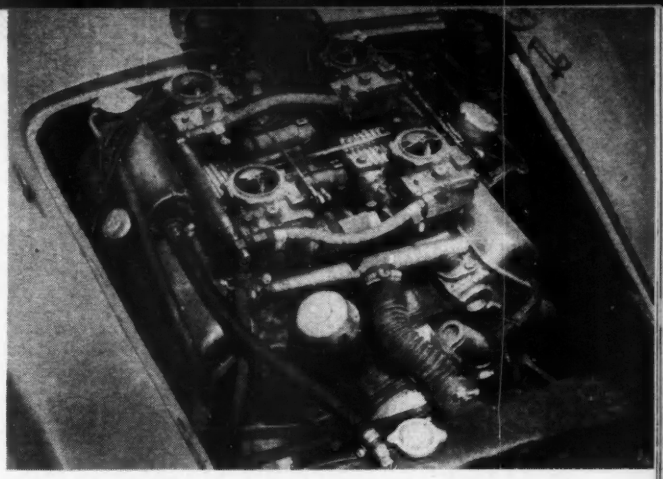
We hope that the new Miller-Hanson car shown on these pages will inspire home builders to attempt the same thing.

John Rostek's Mercedes-Benz 300-SL ran hill in 16:27.3 to win 1501-3000cc class one minute ahead of next car, James Orr's A.C.-Bristol. Rostek also placed 4th in stock car division with Mercury. Notable lack of competition in all three sportscar classes should encourage more cars and drivers for next year's Pikes Peak hillclimb.

Nick Sanborn won stock car class in Chevrolet after winning last year in Pontiac. A former tour driver, he knows every turn on hill.

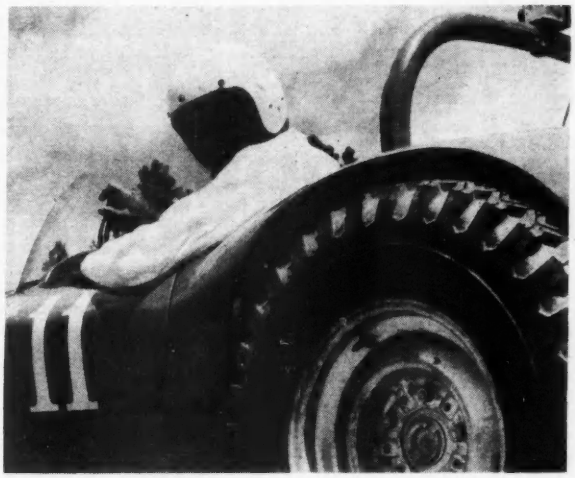
Louis J. Unser drove his Pontiac to stock car second in 15:53.2, only 8 seconds behind winner. Occasionally Pikes Peak gets foggy.

Ak Miller's winning car has Devin fiberglass body, chrome-moly tube frame. Movie camera on roll bar records exciting race moments.



Ak's engine is '59 Olds block with ¼-in. stroke, 420 cu. in. displacement. His own camshaft and four 2-bbl. carbs give ample power.

Rolf Docterman's Alfa Romeo Veloce won under-1500cc sports class, gained International Hillclimb points in surprise victory after local favorite Robert Donner in fast Porsche RSK Spyder spun out and could not restart in time to hold lead. Docterman's time, 18:16, proves large-cubic-inch engines hold key to fast climb up Pikes Peak.



Miller's wide experience in building cars for Mexican Road Race and Mille Miglia helped him put together low-budget Peak racer for cash outlay of $1800. Except for body, most parts are stock components including '37 Ford steering, '53 Chevy front suspension, '52 Lincoln brakes. The rear suspension is coil springs and Monroe shocks.

Jim Cook's '58 Chevrolet placed 3rd among stocks at 15:58.1 over rain-slick course.

HOW STOCK IS A STOCK RACE CAR? Surprisingly stock as they are raced up Pikes Peak. The United States Auto Club, sanctioning body for the Pikes Peak Hill Climb, allows relatively few engine modifications: a choice of camshafts, a .060-in. bore over standard and a single four-barrel carburetor, but no changes to compression or valves. Consequently, the work is generally done to suspension and brakes with the sky the limit. Ride is rough but they stop!

With one exception (a Mercury that races regularly on the professional stock car circuit) the cars we checked before the climb were nearly as soft in the suspension department as the factory intended them to be. The primary change was the substitution of a slightly stiffer shock for the standard model and sometimes the addition of a heavy-duty anti-sway bar. Brakes are no problem on the short Peak run so they remain unchanged. Of course, a roll bar is fitted for protection.

The secret, then, of getting up the hill first is keeping the stocker as light as possible and transferring weight to the rear for added traction. Raise the front, lower the rear or both but get the weight back. The combination works because of the loosely surfaced road and relatively slow speeds in the turns.

What really helps is to know the hill. This was proven by Nick Sanborn's repeat win this year. Young Sanborn, who drove a Pontiac to victory last year, switched to a Chevrolet this time and climbed the hill in 15 mins. 45.2 secs., four seconds better than his old mark, but not a new record. His secret is driving skill coupled with an intimate knowledge of the road gained as a tour driver making several trips a day up and back.

Sanborn, whose win was worth $2850 to him, was followed by Louis J. Unser (nephew of nine-time Championship-car winner Louis Unser) driving a Pontiac in 15:53.6, and Jim Cook's Chevrolet, clocked at 15:58.1.

"The material you have in your book of Hot Rodding is the most complete and authentic I have seen.

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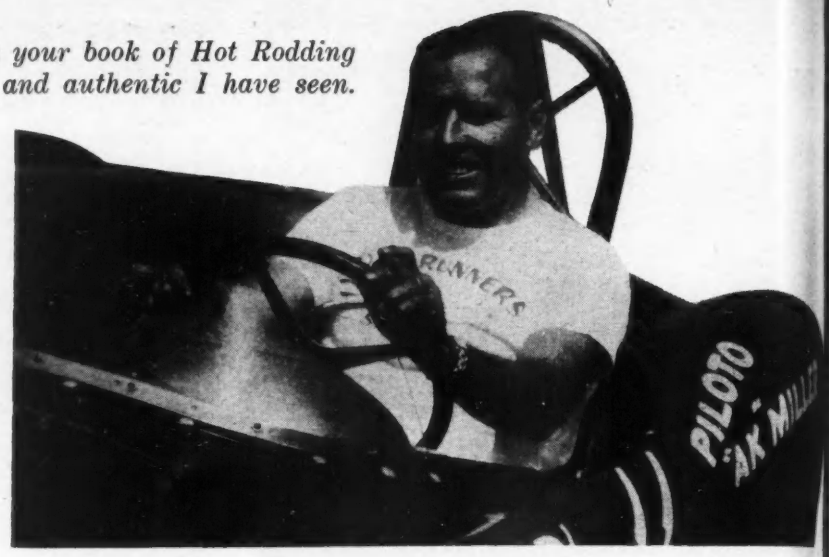

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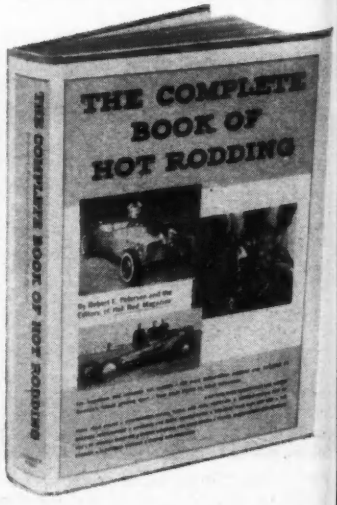

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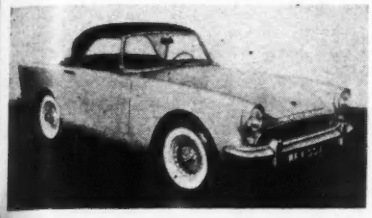
Sunbeam Alpine



Rootes' new sportscar (details and more pictures on pp. 32-33) should have bright future.

WHEN YOU START UP the Alpine's engine, you hear that instant, rasping response to the throttle which most sports models with engines developed from touring units never quite achieve. I had a chance to drive one of a pre-production batch said to be noisier than series models, but I hope that in quietening it they don't lose that crisp throttle response. Careful attention to details of finish complete the good first impression. This looks like a little thoroughbred.

The two-spoked wheel carries a full horn ring; below it are triggers controlling the self-cancelling twin indicators and the (optional) overdrive. Controls for cold air ventilation are neatly built into the instrument panel, which has padded rolls along top and bottom. With three equal-sized pedals in a row it is just possible to "heel-and-toe" between brake and accelerator but during downward gearshifts my thigh hit the lower edge of the steering wheel. I'm told the wheel is set higher on production models. The pull-up hand brake alongside the driving seat is very effective.

The tachometer carries a yellow warning band at 5500; the red section extends from 5750-6000. Running up to the yellow in the gears produces plenty of action. In overdrive 5500 rpm gives a genuine 28 mph in first, 44 in second, 68 in third and 95 mph in top; 100 mph would be about 5780 rpm. Without overdrive 5500 rpm gives about 26 mph in first, 40 in second, 62 in third and 87 in fourth. To get 100 in fourth would mean taking the engine around to 6300 rpm, which sounds improbable.

Making approximate allowance for speedometer error, 0-50 mph seems to take about 10-11 secs., 0-60 mph a little over 13 secs. The engine is quite flexible in traffic driving. Overdrive gives an effortless 60 mph, cruising at 3500 rpm. The ride is level and roll-free but not harsh.

The brakes exert immense power for quite light pedal effort. Steering is light too (recirculating ball) but requires a little more twirling than I expected on sharp corners and roundabouts; it takes 3¼ turns lock-to-lock.

A look under the hood discloses a well finished engine with polished alloy rocker cover. Radiator is cross-flow which helps toward low body lines. The luggage trunk is tiny—only room for one modest suitcase above the spare wheel, but there is room for more behind the seats. One can safely predict a much brighter future for this Alpine than that of the first car to bear the name a few years ago. —**Gordon Wilkins**

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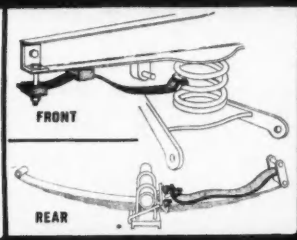

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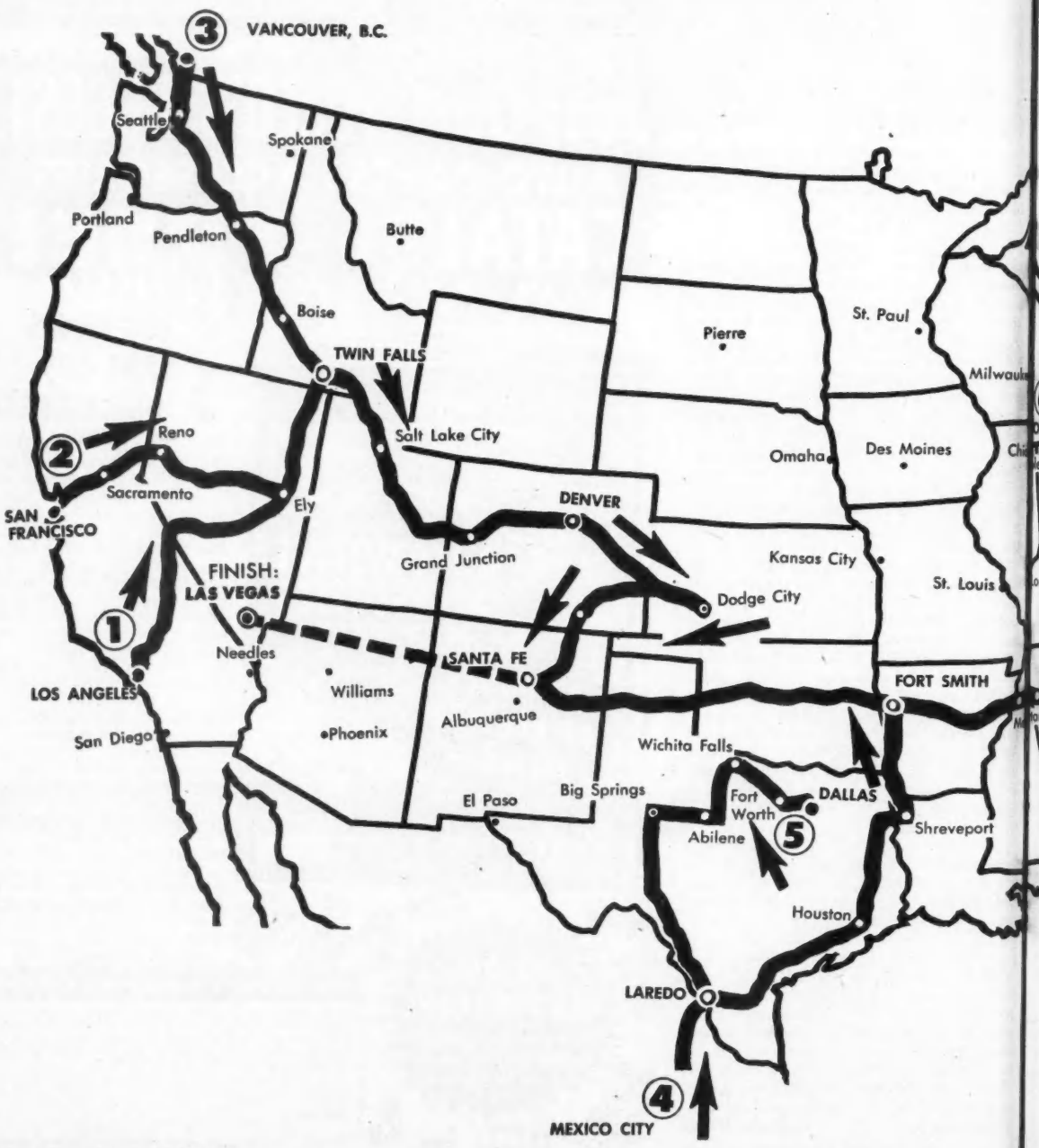
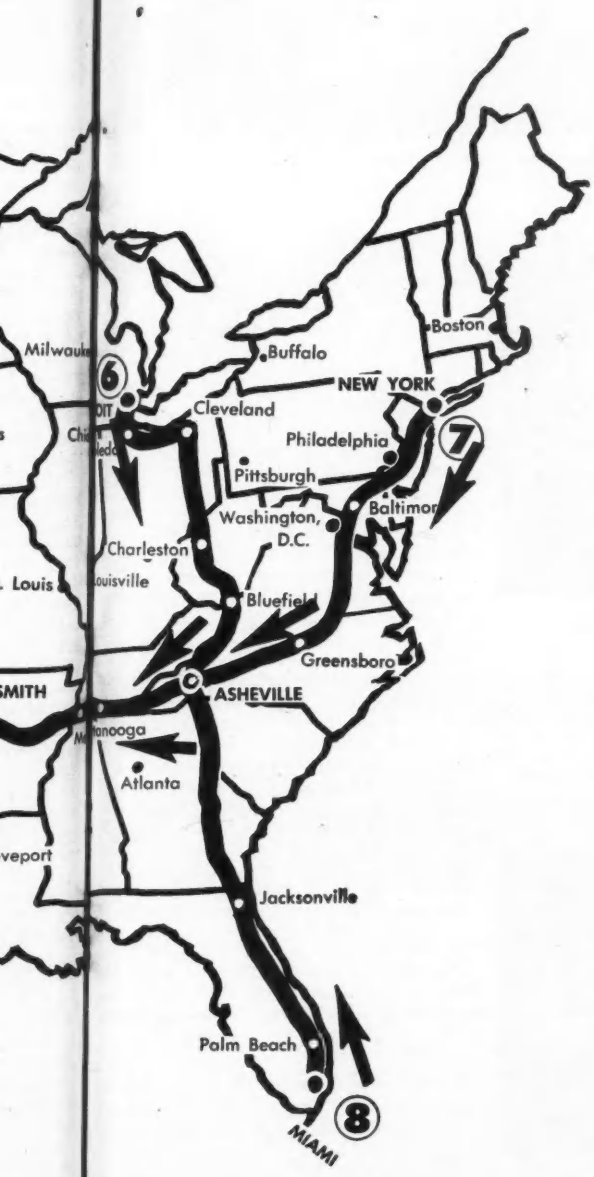


U.S. Version of the Monte Carlo Rally

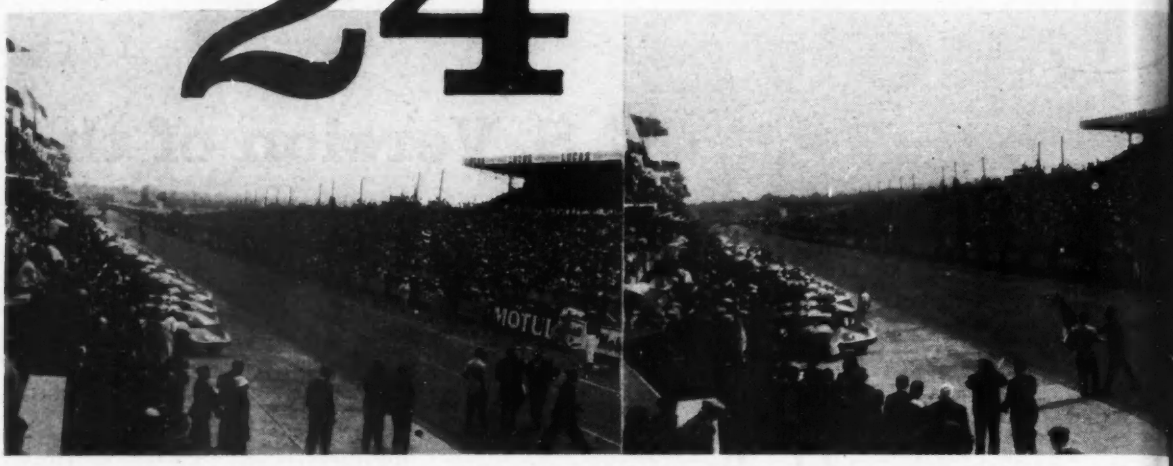


COMING THIS OCTOBER, the American Rally Club, Inc. intends to stage one of the most ambitious rallies for domestic and imported cars ever seen in this country. To date 100 entries have been received and over 400 are expected. There will be eight starting points: Los Angeles, San Francisco, Vancouver, B.C., Dallas, Mexico City, Detroit, New York and Miami. A crew of two or three drivers can start from any of these cities, winding up about 3200 miles and five days later at the finish point in Las Vegas. There is a guaranteed purse of $10,000 to be divided among the first 25 finishers and best teams. To get a crack at this dough, all you have to do is put up $250 of your own money and send to the American Rally Club, 125 E. Linden Ave., Burbank, Calif. for your entry blank and rule book.

Some excerpts from the rule book: "Entrants will leave their chosen starting point, will have to maintain a prescribed course and will be required to maintain varying average speeds between a number of check points. . . . Any rally car that receives a citation for a moving violation will be cause for disqualification. THIS IS NOT A RACE! . . . . Any type of automobile considered a passenger vehicle will be eligible to enter. . . . Any three cars may enter as a team. It will not be necessary for the cars to start from the same location. . . . The winner will be the car finishing the event with the least number of penalty points, second place, next least number, etc. . . ."

The rally will take place October 13-17. Entries close September 15, so pardon us while we rush right out and file ours.

24-HOUR



LE MANS HAS GIVEN ITS NAME TO ANY RUNNING START, AND A FEW DRIVERS HAVE DEVELOPED THE TECHNIQUE TO A HIGH ART.

53 cars start, 13 finish . . . Favorites FERRARI and PORSCHE drop out . . . ASTON-MARTINS take 1-2 for first time . . . Sportscar prototypes predict things to come . . .

SOLID TEAM DISCIPLINE, sound tactics and the brilliance of Stirling Moss (who set a car-breaking pace which lured the Ferraris to destruction in the first three hours)—these were the essential elements that gave Aston Martin a 1-2 victory at Le Mans after 10 years of trying. Ferrari, who had much faster cars and started as hot favorites, seemed to have no coherent strategy. Not a single works car finished, and only the private owners who brought ordinary Gran Turismo models into 3rd, 4th, 5th and 6th places saved the honor of Maranello.

Le Mans still divides itself into two separate events: the unofficial Grand Prix which ends around midnight when most of the sprinters have worn their cars out; and, the real endurance event which is then fought out among the survivors.

The figures speak volumes: 53 cars started and 13 finished. Bits of the sportscars, including the "prototypes," 32 started and three finished (nine per cent) while of the Gran Turismo cars in the true Le Mans tradition, 21 started and 10 finished (48 per cent).

Not a single Porsche finished the race, and not a single Jaguar-engined car. The new ohc Triumphs kept up a good pace but two were eliminated by fan blades going through the header tanks. The fan blades were then removed from the third car, which led the two-liter class until three hours from the finish, when its bearings failed. That is what Le Mans is for, and the production models will be all the better for it.

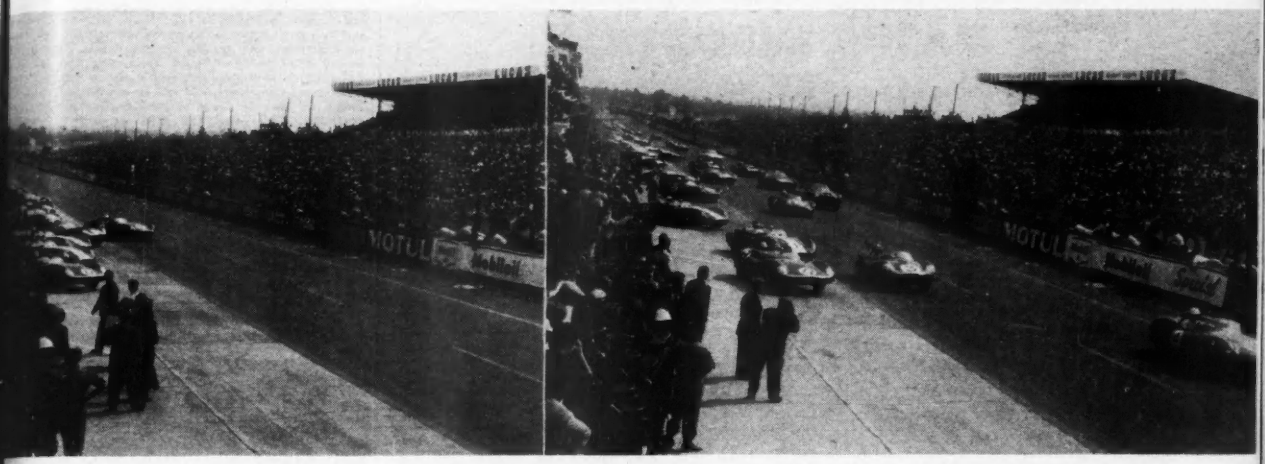
The little 750 Lotus looked a likely winner of both Performance Index and the new fuel economy category but both cars dropped out with engine failure, leaving the D.B. Panhards to pick up the rich prizes in both categories. Two of the three Lotus Elites put on a fine show. Trimmed and finished as though for a holiday trip, they were first and second in their class and second in the fuel economy event, while a two-year-old, privately-owned A.C. won the two-liter class.

Some very interesting figures emerged from the new fuel consumption category, which takes into account fuel consumption and car weight. Up to half time, the little 750cc Lotus had averaged 22 miles per gallon at an average speed of 87.3 mph. The best Porsche was averaging 12.1 mpg at 105.6 mph, while the Saab GT coupe was using fuel at the same rate of 12.1 mpg at an average 80 mph.

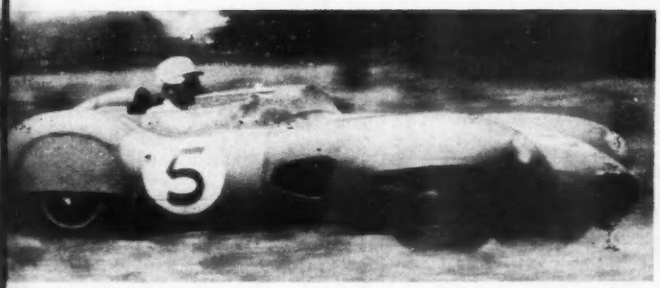
—Gordon Wilkins

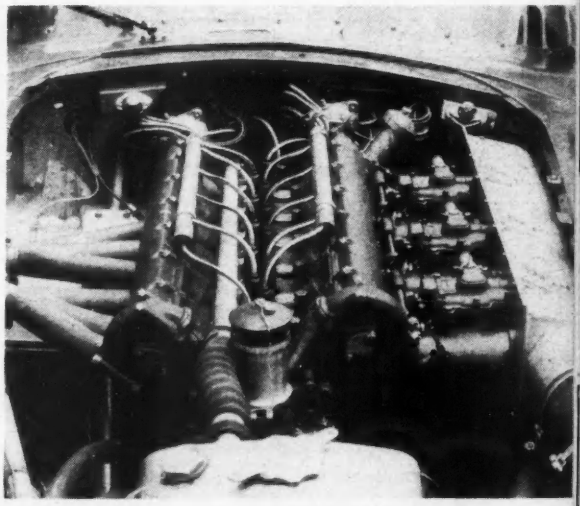
The Bartholoni-Jaeger D. B. tried to restart after a long pit stop to qualify as finisher; died out on first corner.

ENDURANCE RUN

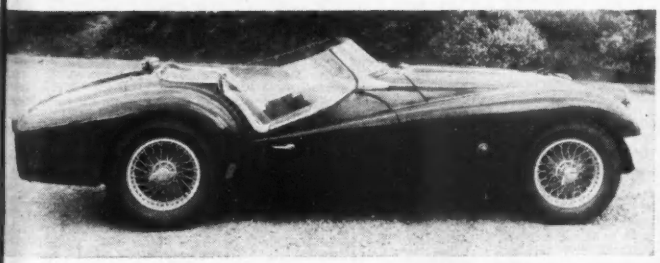


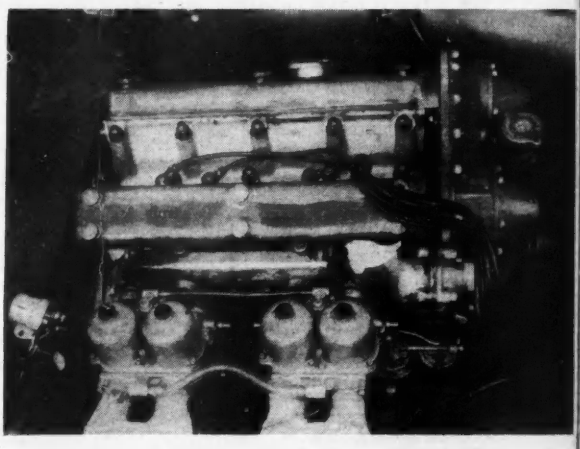
STIRLING MOSS ALWAYS SPRINTS TO HIS CAR LIKE HE'S SHOT FROM A CANNON, GAINS PRECIOUS SECONDS ON EVERY START.





Above: Sunday morning victory. Aston concentrated on perfect preparation; attention to streamlining gave 10 additional mph on long Mulsanne straight. Right: Winning car had double overhead cams, three twin-throat Weber carburetors, cold air box, twin ignition.





Above and right: Triumph entered new TR-3S with double-overhead-cam light-alloy engine, pulled 150 bhp from two-liter displacement. Windscreen encloses all but top of cockpit, body is plastic; disc brakes were fitted all around for Le Mans. Side air intakes duct air to differential. Carburetion is by two siamesed SUs.

PHOTOS BY GUNTHER MOLTER AND GORDON WILKINS

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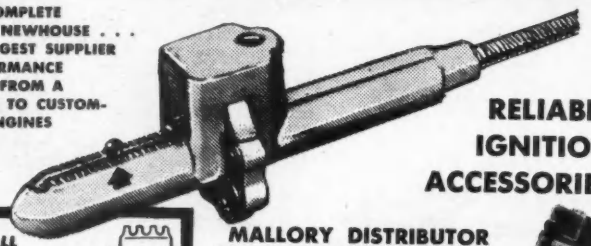

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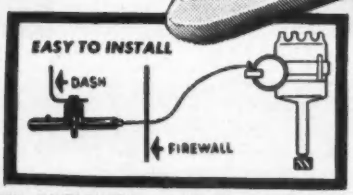

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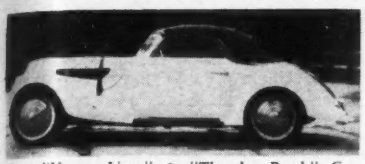

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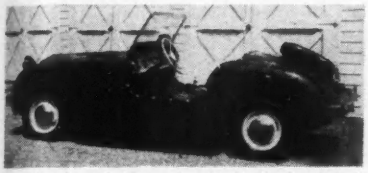

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'17 STANLEY STEAMER Model 730 5-pass. touring car. New boiler, tires; lacquer job 2 yrs. ago. Good performer; 5400 orig. mi. $5000. H. Anderson, 4703 Franklin St., Omaha 4, Neb.

'23 BUICK 6-cyl. spt. rdstr. Knockoff wire wheels, good orig. red leather & tan top. Exc. cond. thruout. $1150. H. Anderson, 4703 Franklin St., Omaha 4, Neb.

'27 ESSEX Super Six sed. 1 owner; 22,000 actual mi. Fully restored, new rubber; must be seen to be appreciated. Driveable anywhere. Send highest offer. Kenneth E. McGee, 28 Elgin Ave. E., Box 828, Goderich, Ont., Canada.

810-812 CORDS & used parts, body & chassis, complete engine, etc. Also '35 Cadillac V-12 engine, body & chassis parts. Jim Taylor, 1515 Austin St., Levelland, Tex.

'30 PIERCE-ARROW rdstr. Rare model, with rumbleseat, 4-speed transmission. $270 engine o'haul, new tires, top & radiator chrome. $1350. Robert Schertle, 756 Hilldale Ave., Berkeley, Calif. Phone LA 4-4444.

'39 HISPANO-SUIZA J-12 4-place conv., body by Van Vooren. Just completed extensive restoration—

new paint, top, carpets, chrome, wiring, lights, etc. Took 2nd at recent concours. Write for pix & details. Jim De Bickero, 7802 S. Honore, Chicago 20.

'31 MODEL A Sport Victoria. Rare body style; 2 sidemounts. Not running, but in restorable shape. Best offer over $300. Rex Altman, 1232 Alder Ave., Lewiston, Ida.

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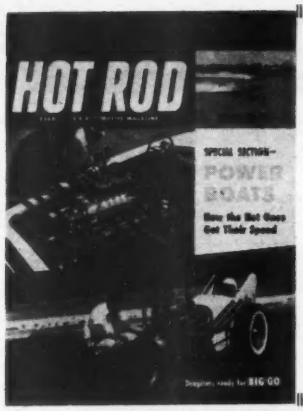
'55 JAGUAR cpe. Modified 210-hp C engine. Exc. cond., 43,000 mi. Available around Sept. 1. Best offer over $1800. A. Moses, T-229 Arlington Towers, Arlington 9, Va.

'39 PACKARD 8 6-pass. sed. Baby blue; in good orig. cond. Running & mech. sound; body needs minor repair. 54,000 mi. Best offer. John A. Cleveland, R.R. #1, Culver, Ind. Phone VIking 2-3169.

'47 LINCOLN CONTINENTAL conv. '54 Cadillac engine with less than 20,000 mi. R & h, o.d., ww's.

continued on page 80



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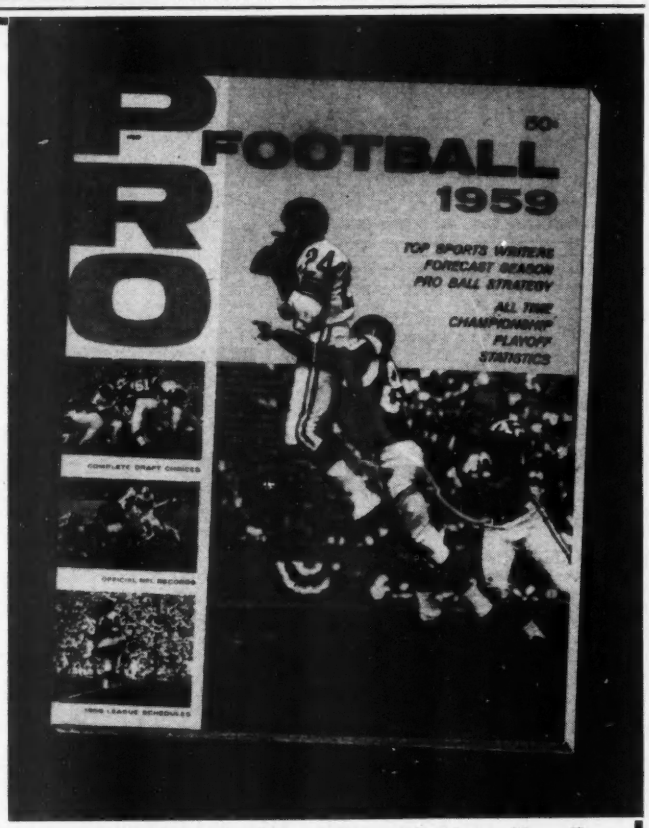

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'47 LINCOLN CONTINENTAL conv. Good orig. cond.—o'hauled V-12 engine, blue paint, white top, leather uph. Extra good. Best offer over $1200. Paul G. Conmy, P.O. Box 242, Fargo, N. D.

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'37 LINCOLN K V-12 4-dr., 7-pass. cabriolet, with alum. body by Brun; sidemounts. Exc. cond., 21,400

mi.; orig. tires. $1125 or swap for '32-'33 Cadillac V-16 conv. R. S. Fralick, 10014 NW 5th Ave., Miami 50, Fla. Phone PL 7-1351.

'41 LINCOLN CONTINENTAL cpe., with '51 Lincoln conversion. Over $2500 in restoration. Sell for $1475 or trade for classic phaeton. Milford Barker, R.R. 2, Waverly, Ohio.

TUCKER rear-engine sed. 7000 actual mi. An outstanding car to drive or exhibit. $2500; will consider trade. R. J. Turner, 5319 Minnetoga Terr., Hopkins, Minn.

AUBURN 852 speedster. $2800. Consider RWD Cord as part payment. Come & see it; no letters answered, no pix. H. Denhard, R.D. 2, Greenville, N. Y.

'32 FORD pickup. Chopped & sectioned, full race Merc engine. Very low mileage. Body exc., ready for painting. Will trade for good Jeep. Darrell Lassiter, Box N-16, Hurricane, Utah.

WANTED

LITERATURE on all '34 DeSoto models. G. C. Blunk, 605 Williams Blvd., Springfield, Ill.

PARTS, information, literature on '32 Hupmobile 8 4-dr. spt. sed. Need lock door handle, windwings, other parts. Also *Motor* or similar repair manuals '25-'42. John Tierney, 10204 Jurupa Rd., Mira Loma, Calif.

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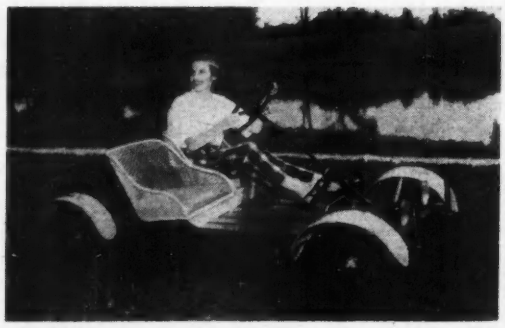

DETROIT'S plans

continued from page 27

Stout's original rear-engine prototype placed the driver right in the nose. It was powered by a Ford V8 using a conventional Ford three-speed gearbox. The body was unitized construction with only two doors—one at the left front entering into the driver's seat, and one at the right rear. Seating arrangement was very unconventional, with a fixed rear cross seat and two movable chairs which could be arranged to suit the comfort of the riders. The driver sat alone on an adjustable seat. This model also had a built-in desk in rear of the driver's seat. The movable seats proved impractical as the occupants had a tendency to suddenly move up around the driver when the brakes were applied. They had to be anchored.

The suspension was independent all around, using aircraft oleo shocks. Their effectiveness was proven on a trial spin over washboard roadbed; Stout placed a tumbler of water, almost level full, on the narrow ledge in front of the driver and never spilled a drop.

The original prototype, while providing many living room comfort features, made no provision for baggage. It was based on a 100-in. wheelbase and the radiator was mounted just ahead of the engine in the rear which, in turn, was mounted just ahead of the rear axle. Bill felt it was necessary to build up some pressure in the engine compartment to discourage papers and such from being sucked into it.

The 1935 Scarab was a dolled-up version of the 1934 prototype. The wheelbase was increased slightly and the driver was moved a little more to the rear but still in a cockpit position provided by a sweptback split windshield. A long seat had been extended down the right side, running longitudinally, which could be used as a couch. A fold-down table, not unlike those used in current executive-type aircraft, was provided in front of the rear seat. Runningboards had been eliminated in both models. It was aimed to sell for $5000 in limited production. When World War II broke out the project went into abeyance.

In 1946, Bill brought out a luxury model on a 137-in. wheelbase, incorporating all the advantages of the earlier models and using a fiberglass body. The interior of the body was six feet wide and 11 feet long. The windshield was made of curved plexiglas and wrapped around the driver's compartment, providing great glass area. Despite its length, width and wheelbase, the car weighed only 3200 lbs. The car rode and handled well and because of its relatively light weight was economical. But, with a price tag of $10,000 it found no takers.

Unquestionably, Chevrolet engineers are as conscious of the problems of designing a rear-engine car as Bill Stout was more than a decade ago. Could be the forthcoming rear-engine Corvair will overcome these difficulties by a method suggested by its detractors: ". . . an entirely fresh approach to the design of these units [engine and transmission] and the type of materials used."

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—Bill Callahan

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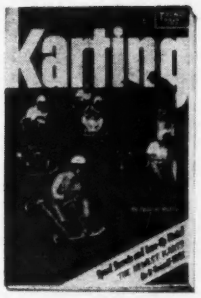

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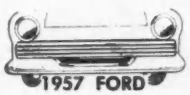
1959 FORD

1958 FORD & Thunderbird


1957 FORD

55-56 FORD

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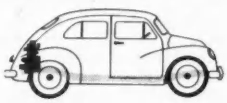

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